

AD-773 475

QUENCHING (COOLING)

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FEBRUARY 1974

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*Bibliographies	Aluminum Alloys	Heat Treatment
*Quenching	Titanium Alloys	Iron Alloys
Heat Transfer	Steel	Martensite
Crystal Lattice Defects	Submarine Hulls	(See Reverse)
Nickel Alloys	Iron	
20. ABSTRACT (Continue on reverse side if necessary and identify by block number)		
This bibliography is a collection of references relating to the various techniques of quenching metals and alloys to optimize their properties.  Corporate Author-Monitoring Agency, Subject, Title, and Personal Author Indexes are included.		

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*(Item 19, cont'd) KEYWORDS*

Phase Studies  
Powder Metallurgy  
Stress Corrosion

11

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## FOREWORD

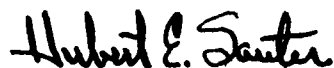
This bibliography is a compilation of 208 references on *Quenching(Cooling)* and supersedes AD-704 400.

Entries were selected from reports processed into the Defense Documentation Center's AD collection from January 1960 to December 1973.

Corporate Author-Monitoring Agency, Subject, Title, and Personal Author Indexes are provided.

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**HUBERT E. SAUTER**  
Administrator  
Defense Documentation Center



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TITLE.....	T-1
PERSONAL AUTHOR.....	P-1

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-281 854  
COLUMBIA UNIV NEW YORK

RESEARCH AND DEVELOPMENT: WITH RESPECT TO HEAT  
TRANSFER IN QUENCHING.

(U)

DESCR. PTIVE NOTE: FINAL REPT., 16 DEC 55-15 DEC 61.  
JUL 62 53P PASCHKIS, V. ISTOLZ, GEORGE,  
JR.;

REPT. NO. 1540 6  
CONTRACT: DA30 0690RD1621  
PROJ: 599-1-004  
MONITOR: AROD 1540 6

UNCLASSIFIED REPORT

DESCRIPTORS: \*COOLING, \*HEAT TRANSFER, \*SILVER, \*STEEL,  
BOILING, FILM BOILING, NUCLEATE BOILING, OSCILLOGRAPHS,  
PLATING, PROCESSING, SURFACES, TEMPERATURE, TEST  
EQUIPMENT, THERMOCOUPLES, THERMODYNAMICS

(U)

THE DETERMINATION OF HEAT TRANSFER COEFFICIENTS OF  
STEEL AND AG FROM EXPERIMENTS UNDER CONTROLLED  
CONDITIONS AND THE CORRELATION AND GENERALIZATION OF  
THE EXPERIMENTAL RESULTS ARE DISCUSSED. SAMPLES  
WERE HEATED AND QUENCHED UNDER CONTROLLED CONDITIONS.  
THERMOCOUPLES WERE USED TO RECORD THE TEMPERATURES  
AT SEVERAL POINTS IN THE SAMPLE ON AN OSCILLOGRAPH.  
THE GALVANOMETER TRACES WERE READ OUT ON A  
SPECIALLY CONSTRUCTED OSCILLOGRAM READER. FROM  
THESE COOLING CURVES, SURFACE HEAT FLUX AND SURFACE  
TEMPERATURE WERE COMPUTED AS FUNCTION OF TIME.  
NUMERICAL TECHNIQUES DEVELOPED FOR THIS PURPOSE AND  
PROGRAMMED FOR A DIGITAL COMPUTER WERE EMPLOYED.  
RESULTS ARE REPORTED AS HEAT FLUX OR HEAT TRANSFER  
COEFFICIENT VS. SURFACE TEMPERATURE. (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMCI

AD-282 362

CALIFORNIA INST OF TECH PASADENA W M KECK LAB OF  
ENGINEERING MATERIALS

RAPID QUENCHING OF LIQUID ALLOYS

(U)

JUL 62 IV DUWEZ, POLIWILLENS, R.H. I  
REPT. NO. TR7  
CONTRACT: NONR22030

UNCLASSIFIED REPORT

DESCRIPTORS: \*ALLOYS, \*LIQUID METALS, CHROMIUM, COOLING,  
CRYSTAL STRUCTURE, DESIGN, EJECTION, FOILS, MELTING,  
PHASE STUDIES, PRESSURE, SHOCK TUBES (U)

A TECHNIQUE IS DESCRIBED BY WHICH METASTABLE ALLOY  
PHASES CAN BE OBTAINED BY VERY RAPID COOLING FROM THE  
LIQUID STATE. THE RESULTS OBTAINED SO FAR HAVE  
LEAD TO EXTENSION OF SOLUBILITY LIMITS BEYOND THEIR  
EQUILIBRIUM VALUES, NEW PHASES NOT FOUND UNDER  
EQUILIBRIUM CONDITIONS, AND AMORPHOUS ALLOYS.  
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-282 836

AERONAUTICAL SYSTEMS DIV WRIGHT-PATTERSON AFB OHIO

A STUDY OF QUENCH HARDENING IN PLATINUM AND GOLD (U)

MAY 62 IV GEGEL, HAROLD LOUIS;  
REPT. NO. TDR62 329  
MONITOR: ASD TDR62 329

UNCLASSIFIED REPORT

DESCRIPTORS: \*GOLD, \*PLATINUM, AGING (PHYSIOLOGY),  
COOLING, CRYSTAL STRUCTURE, CRYSTALS, DEFORMATION,  
HARDENING, HEAT TREATMENT, MECHANICAL PROPERTIES,  
PROCESSING, RECOVERY, TEMPERATURE, TENSILE PROPERTIES(U)

VACANCY COMPLEXES WERE FORMED DURING THE QUENCHING PERIOD WHEN THE AVERAGE QUENCHING SPEED WAS LESS THAN 10 TO THE 5TH POWER DEGREE C/SEC. THE BINDING ENERGY FOR DIVACANCIES IN AU WAS ESTIMATED TO BE APPROXIMATELY 0.28 EV. THE INFLUENCE OF INCREASED QUENCHING SPEEDS IS TO INCREASE THE TEMPERATURE RECOVERY RANGE FOR ISOCHRONAL RECOVERY. SIMILARLY, FAST QUENCHING RATES CAUSED AN INCUBATION PERIOD IN THE ISOTHERMAL AGING EXPERIMENTS FOR AU. NO INCUBATION PERIOD WAS OBSERVED FOR PT. THE INCUBATION PERIOD IS ATTRIBUTED TO THE TIME NECESSARY TO DEVELOP VACANCY COMPLEXES WHICH HAVE THE APPROPRIATE GEOMETRY TO INFLUENCE THE YIELD STRENGTH. THE ACTIVATION ENERGY FOR RECOVERY IN THE QUENCH-HARDENED PT WAS DETERMINED TO BE 1.43 EV, WHICH IS LESS THAN THE ACTIVATION ENERGY FOR SELF-DIFFUSION. IT WAS OBSERVED TO BE APPROXIMATELY EQUAL TO THE SUM OF THE CONSTRICTION ENERGIES FOR SCREW AND EDGE DISLOCATIONS. THE ACTIVATION ENERGY FOR AU IS GREATER THAN THAT FOR SELF-DIFFUSION. TWO DISTINCT HARDENING MECHANISMS EXIST FOR PT AND AU WHEN THE VALUES OF THE ACTIVATION ENERGY FOR RECOVERY ARE TAKEN INTO ACCOUNT. THE HARDENING MECHANISM FOR AU IS THOUGHT TO BE DUE TO THE INTERACTION OF DISLOCATIONS WITH EXTENDED SESSILE DISLOCATIONS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-284 409

ELECTRO-OPTICAL SYSTEMS INC PASADENA CALIF

INVESTIGATION OF THE EFFECT OF ULTRA-RAPID QUENCHING  
ON METALLIC SYSTEMS, INCLUDING BERYLLIUM ALLOYS (U)

JUN 62 IV JORDAN, C. I

REPT. NO. TDR62 1811650

CONTRACT: AF33 616 8011

MONITOR: ASD TDR62 181

UNCLASSIFIED REPORT

DESCRIPTORS: \*ALLOYS, \*BERYLLIUM ALLOYS, ALUMINUM  
ALLOYS, COOLING, COPPER ALLOYS, HYDRIDES, MATERIALS,  
NICKEL ALLOYS, OXIDES, PHASE STUDIES, SCANDIUM, SILICON  
ALLOYS, TEST EQUIPMENT, TESTS, ZINC ALLOYS (U)

INVESTIGATION OF THE EFFECT OF ULTRA-RAPID  
QUENCHING ON 8 BERYLLIUM ALLOY SYSTEMS.

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-289 325

ILLINOIS UNIV URBANA

THE DIFFUSION OF SINGLE AND DIVACANCIES IN QUENCHED  
GOLD

(U)

JUL 62

1V

DE JONG, M. I KOEHLER, J. S. I

REPT. NO. TR3

CONTRACT: NONR183426

UNCLASSIFIED REPORT

DESCRIPTORS: \*GOLD, COOLING, CRYSTAL LATTICES, CRYSTAL  
STRUCTURE, DEFORMATION, DIFFUSION, ELECTRICAL  
PROPERTIES, ENERGY, HEAT TREATMENT, MATHEMATICAL  
ANALYSIS, THEORY

(U)

ENERGIES OF FORMATION AND MOTION OF VACANCIES AND  
DIVACANCIES IN QUENCHED GOLD.

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZONCI

AD-400 501

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

KINETIC AND GEOMETRIC CHARACTERISTICS OF MARTENSITE  
CONVERSION IN AN IRON-NICKEL-MANGANESE ALLOY (U)

FEB 63 IV BLANTER, M. YE. INOVICHKOV, P. V. :  
REPT. NO. TT 62 1760

UNCLASSIFIED REPORT

DESCRIPTORS: \*PHOTOGRAPHIC PROCESSORS, \*MARTENSITE,  
\*PHASE STUDIES, CRYSTAL GROWTH, CRYSTALS,  
EXPERIMENTAL DATA, GRAIN STRUCTURES(METALLURGY),  
HEAT TREATMENT, IRON ALLOYS, MANGANESE ALLOYS,  
MATHEMATICAL ANALYSIS, MATHEMATICAL MODELS, NICKEL  
ALLOYS, NUCLEATION, QUENCHING(COOLING),  
TEMPERATURE, THEORY, TIME, TRANSFORMATIONS,  
TRANSITION TEMPERATURE (U)  
IDENTIFIERS: \*TERNARY SYSTEMS (U)

TRANSLATION OF FOREIGN RESEARCH: KINETIC AND  
GEOMETRIC CHARACTERISTICS OF MARTENSITE CONVERSION IN  
AN IRON-NICKEL-MANGANESE ALLOY. (M)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-400 505

FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

TO DETERMINE THE ENERGY OF FORMATION OF VACANCIES IN  
SILVER (U)

FEB 63 IV OVCHARENKO, O.M.I  
REPT. NO. TT 63 124

UNCLASSIFIED REPORT

DESCRIPTORS: \*SILVER, ALUMINUM, COPPER, DIFFUSION, GOLD,  
HEAT OF FORMATION, HEAT TREATMENT, OXYGEN, PLATINUM,  
QUENCHING (COOLING), RESISTANCE (ELECTRICAL), THERMAL  
DIFFUSION (U)

TRANSLATION OF FOREIGN RESEARCH: ENERGY OF FORMATION AND  
ENERGY OF ACTIVATION IN DISLOCATION OF VACANCIES IN  
SILVER.



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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-404 466

LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF

BERYLLIUM: AN ANNOTATED BIBLIOGRAPHY, JULY -  
SEPTEMBER 1962. SUPPLEMENT II,

(U)

DESCRIPTIVE NOTE: OMP. BY JACK B.  
APR 63 59P

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: \*BERYLLIUM, WELDING, INTERMETALLIC  
COMPOUNDS, BERYLLIUM ALLOYS, ABSTRACTS, ZIRCONIUM  
ALLOYS, TITANIUM ALLOYS, SOLDERING ALLOYS, PATENTS,  
QUENCHING (COOLING), TELLURIUM ALLOYS, ANTIMONY ALLOYS,  
TEST METHODS, MAGNESIUM ALLOYS, GAMMA RAYS,  
SPECTROSCOPY, CHEMISTRY, MECHANICAL PROPERTIES,  
SANDWICH PANELS, ANALYSIS, CHEMICAL ANALYSIS, OXIDES,  
SULPHUR, BERYLLIUM COMPOUNDS, CRYSTAL STRUCTURE,  
EXTRUSIONS, MANUFACTURING METHODS, MECHANICAL WORKING,  
POWDER METALLURGY, PROCESSING, CORROSION, BONDING,  
SHEETS, BIBLIOGRAPHIES

(U)

THE ANNOTATED BIBLIOGRAPHY COVERS PUBLICATIONS  
RELEASED DURING THE THIRD QUARTER OF 1962.  
CITATIONS ARE ARRANGED ALPHABETICALLY BY AUTHOR  
UNDER THE BROAD SUBJECT HEADINGS OF ALLOYS;  
ANALYSIS; APPLICATIONS; BIBLIOGRAPHIES;  
COMPOUNDS; CORROSION; FABRICATION TECHNIQUES;  
JOINING; MINERALOGY; OXIDES; POWDER  
METALLURGY AND CASTING; PROCESSING;  
PROPERTIES; AND MISCELLANEOUS. REFERENCE TO  
THE USE OF BERYLLIUM IN FUELS, NUCLEAR REACTOR  
APPLICATIONS, EFFECTS OF RADIATION, AND CU-BE  
ALLOYS HAVE BEEN OMITTED. THE RESOURCES OF  
LOCKHEED MISSILES AND SPACE COMPANY  
TECHNICAL INFORMATION CENTER WERE UTILIZED IN  
THE PREPARATION OF THE BIBLIOGRAPHY. (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-405 821

GENERAL ELECTRIC CO SCHENECTADY N Y

PEST REACTIONS IN INTERMETALLIC COMPOUNDS. I. GRAIN  
BOUNDARY HARDENING IN NIGA. (U)

DESCRIPTIVE NOTE: FINAL REPT. FEB 62-FEB 63,  
APR 63 37P SEYBOLT, A. U. WESTBROOK, J. H. I  
MONITOR: ASD TDR63 309 P1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPORT ON REFRACTORY INORGANIC  
NONMETALLIC MATERIALS.

DESCRIPTORS: \*INTERMETALLIC COMPOUNDS, \*NICKEL  
ALLOYS, \*GALLIUM ALLOYS, HIGH TEMPERATURE  
RESEARCH, OXYGEN, NITROGEN, IMPURITIES, HARD  
NESS, CONTROLLED ATMOSPHERES, COOLING, QUENCH  
ING (COOLING), AGING (MATERIALS), HEAT TREAT  
MENT, PENETRATION, MICROSTRUCTURE, CRYSTAL  
LATTICES, DENSITY, HEAT OF FORMATION, HEAT OF  
REACTION, DIFFUSION, MATHEMATICAL ANALYSIS,  
CRYSTAL LATTICE DEFECTS, OXIDATION, BRITTLINESS. (U)  
IDENTIFIERS: PEST REACTIONS, CSCL STRUCTURE  
COMPOUNDS, MICROHARDNESS. (U)

THE PHENOMENON OF GRAIN BOUNDARY HARDENING HAS BEEN  
EXPLORED FOR THE CSCL STRUCTURE INTERMETALLIC  
COMPOUND NIGA. NIGA HAS A HOMOGENEITY RANGE  
OF A FEW PERCENT AND IT WAS POSSIBLE TO EXAMINE THE  
EFFECT OF STOICHIOMETRY UPON THE GRAIN BOUNDARY  
HARDENING DUE TO PREFERENTIAL OXYGEN DIFFUSION DOWN  
GRAIN BOUNDARIES. WHILE SOME GRAIN HARDENING WAS  
NOTICEABLE JUST BELOW 50% GA, THE EFFECT WAS MUCH  
LESS PRONOUNCED THAN AT 52% GA. IT WAS POSSIBLE  
TO ESTIMATE BOTH BULK DIFFUSION AND GRAIN BOUNDARY  
DIFFUSION RATES FOR OXYGEN. THE RESULTS SUGGEST  
THAT HARDENING IS DUE TO LATTICE DISTORTIONS WHICH  
ARISE FROM THE FORMATION OF A GA-O COMPLEX.  
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-405 898  
AEROJET-GENERAL CORP AZUSA CALIF

STRESS-CORROSION CRACKING OF HIGH-STRENGTH  
ALLOYS.

(U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 9, 1 JAN-  
31 MAR 63,  
MAY 63 1V SETTERLUND, R.B.:  
REPT. NO. 0414 01 9  
CONTRACT: DA04 4950RD3069

UNCLASSIFIED REPORT

DESCRIPTORS: \*TITANIUM ALLOYS, \*STEEL, \*COR  
ROSION, \*HEAT RESISTANT METALS AND ALLOYS,  
ALUMINUM ALLOYS, VANADIUM ALLOYS, NICKEL  
ALLOYS, COBALT ALLOYS, HEAT TREATMENT,  
QUENCHING (COOLING), AGING (MATERIALS),  
WELDING, COLD WORKING, ROCKET CASES, TESTS,  
TEST METHODS, CONTROLLED ATMOSPHERES, PROTECTIVE  
TREATMENTS, COATINGS, HARDNESS, TENSILE  
PROPERTIES, FRACTOGRAPHY, FRACTURE (MECHANICS),  
FATIGUE (MECHANICS), EXPERIMENTAL DATA,  
STRESSES.

(U)

IDENTIFIERS: 20% NICKEL MARAGING STEEL, 18% NICKEL  
MARAGING STEEL, VASCOJET 1000 STEEL.

(U)

TEST RESULTS SHOWED THAT, UNDER ALL THE TEST  
CONDITIONS OF THIS PROGRAM, THE 6A1-4V TITANIUM  
ALLOY IS IMMUNE TO STRESS-CORROSION CRACKING IN THE  
ANNEALED, QUENCHED-AND-AGED, AND AS-WELDED  
CONDITIONS. THE 20%-NICKEL GRADE OF MARAGING  
STEEL WAS FOUND TO BE HIGHLY SUSCEPTIBLE TO STRESS-  
CORROSION CRACKING IN THE ANNEALED-AND AGED  
CONDITION. THIS SAME ALLOY, WHEN COLD WORKED 50 TO  
75% BEFORE AGING, WAS FOUND TO BE ONLY MILDLY  
SUSCEPTIBLE TO STRESS-CORROSION CRACKING. THE MOST  
FAVORABLE MECHANICAL PROPERTIES WERE ATTAINED AFTER  
50% COLD REDUCTION AND SUBSEQUENT AGING. THE  
WELDED-AND-AGED ALLOY WAS FOUND TO BE EXTREMELY  
SUSCEPTIBLE TO STRESS CORROSION CRACKING IN THE WELD-  
HEAT-AFFECTED ZONE. THE 18%-NICKEL GRADE OF  
MARAGING STEEL WAS ALSO FOUND TO BE SUSCEPTIBLE TO  
STRESS-CORROSION CRACKING, WHICH WAS FOUND TO OCCUR  
MORE RAPIDLY IN THE ANNEALED-AND-AGED MATERIAL THAN  
IN THE 50% COLD-WORKED-AND-AGED MATERIAL.  
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-407 363  
WATERTOWN ARSENAL LABS MASS

AUSTENITIC DECOMPOSITION IN WELDING STEEL, (U)

MAR 63 33P D'ANDREA, MARK M. ,JR.:  
MONITOR: WAL TR320

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: MASTER'S THESIS. REPORT ON  
MATERIALS FOR ARMY WEAPONS AND COMBAT MOBILITY.

DESCRIPTORS: \*WELDING, \*STEEL, \*METALLOGRAPHY,  
MICROSTRUCTURE, HARDNESS, GRAIN STRUCTURES (METALLURGY),  
HEAT TREATMENT, EXPERIMENTAL DATA, COOLING, TOUGHNESS,  
LOW TEMPERATURE RESEARCH, IMPACT SHOCK, BAINITE, THERMAL  
EXPANSION, AUSTENITE, WELDING (U)  
IDENTIFIERS: AISI 4340 STEEL (U)

A TIME-TEMPERATURE CONTROLLER WAS USED IN  
CONJUNCTION WITH A DILATOMETER TO STUDY THE  
TRANSFORMATIONAL BEHAVIOR OF WELD HEAT-AFFECTED ZONE  
AUSTENITE UPON COOLING FROM A 1700 F PEAK TEM-  
PERATURE. CONTINUOUS-COOLING TRANSFORMATION  
DIAGRAMS WERE MADE IN THIS WAY OF AISI 4340 STEEL  
INITIALLY QUENCHED-AND-TEMPERED TO 54 AND 44 RC  
HARDNESS LEVELS. A CHARACTERISTIC GROWTH CURVE FOR  
AN ISOTHERMAL BAINITE TRANSFORMATION WAS DETERMINED  
DILATOMETRICALLY. THE AMOUNT OF AUSTENITE RETAINED  
AT ROOM TEMPERATURE WAS FOUND TO INCREASE AND THEN  
DECREASE DURING THE BAINITE RAPID-REACTION PERIOD.  
IMPACT TESTS INDICATED THAT RETAINED AUSTENITE IN  
THE AMOUNTS PRESENT WAS NOT NECESSARILY DELETERIOUS  
TO NOTCH TOUGHNESS. A LIMITED ARC-WELDING STUDY  
WAS MADE AND COMPARED WITH THE TIME-TEMPERATURE  
CONTROLLER WORK. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-408 483

ARIZONA UNIV TUCSON

IMPERFECTIONS IN METALS.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 1 JAN 60-31 DEC 62,

JAN 63 13P TOMIZUKA, C.T.;

CONTRACT: AF49 638 790

MONITOR: AFOSR 4642

UNCLASSIFIED REPORT

DESCRIPTORS: (\*ALLOYS, CRYSTAL LATTICE DEFECTS), (\*METALS, CRYSTAL LATTICE DEFECTS), HIGH PRESSURE RESEARCH, DIFFUSION, HYDROSTATIC PRESSURE, HEAT OF ACTIVATION, INTERNAL FRICTION, MEASUREMENT, TRACER STUDIES, QUENCHING (COOLING), COPPER, SINGLE CRYSTALS, IMPURITIES, MERCURY, SELENIUM, BRASS, COPPER ALLOYS, ZINC ALLOYS, SILLOYS, ZINC, GOLD, PLATINUM, HIGH TEMPERATURE RESEARCH, MAGNETIC PROPERTIES.

(U)

IDENTIFIERS: 1963, VACANCIES.

(U)

DIFFUSION IN PURE NOBLE METALS UNDER HYDROSTATIC PRESSURE; DIFFUSION AS A FUNCTION OF TEMPERATURE; INTERNAL FRICTION IN ALPHA BRASS; TRACER DIFFUSION STUDIES; ACTIVATION VOLUME OF A VACANCY.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZONC1

AD-409 729

CALIFORNIA INST OF TECH PASADENA W M KECK LAB OF  
ENGINEERING MATERIALS

DEFECTS IN ALUMINUM QUENCHED FROM THE LIQUID STATE,

(U)

MAY 63 14P  
CONTRACT: NONR22030

THOMAS, G. I WILLENS, AND R. H. I

UNCLASSIFIED REPORT

DESCRIPTORS: (\*ALUMINUM, QUENCHING (COOLING)),  
(\*CRYSTAL LATTICE DEFECTS, ALUMINUM), (\*QUENCH  
ING (COOLING), ALUMINUM), LIQUID METALS,  
LIQUIDS, STRESSES, ENTROPY, EQUATIONS, ELEC  
TRON MICROSCOPY, CRYSTAL LATTICES.

(U)

IDENTIFIERS: 1963.

(U)

HIGH PURITY ALUMINUM WAS QUENCHED FROM THE LIQUID  
STATE AND SPECIMENS WERE EXAMINED BY TRANSMISSION  
ELECTRON MICROSCOPY. VERY HIGH DENSITIES OF  
DEFECTS IN THE FORM OF PERFECT LOOPS, IMPERFECT  
LOOPS, AND SMALL BLACK SPOTS WERE OBSERVED. THE  
VACANCY CONCENTRATION, AS DEDUCED FROM THE NUMBER AND  
SIZE OF DEFECTS, INCREASE WITH INCREASING TEMPERATURE  
AT A MUCH SLOWER RATE IN THE LIQUID THAN IN THE  
SOLID. BOTH THE VACANCY FORMATION ENERGY AND THE  
ENTROPY FACTOR APPEAR TO BE CONSIDERABLY REDUCED  
ABOVE THE MELTING POINT. ALSO, A DISCONTINUITY IN  
THE VACANCY CONCENTRATION IS OBSERVED AT THE MELTING  
POINT. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-410 100  
MASSACHUSETTS INST OF TECH CAMBRIDGE LAB FOR INSULATION  
RESEARCH

IONIC CONDUCTIVITY IN KCL-KBR MIXED SINGLE  
CRYSTALS,

(U)

MAY 63 24P  
REPT. NO. TR180  
CONTRACT: AF19 604 8483

UNCLASSIFIED REPORT

DESCRIPTORS: (\*IONS, ELECTRICAL CONDUCTANCE),  
(\*SINGLE CRYSTALS, MIXTURES), (\*CHLORIDES,  
BROMIDES), CHEMICAL PROPERTIES, HEATING, HEAT  
OF ACTIVATION, QUENCHING (COOLING), CRYSTAL  
LATTICE DEFECTS, IMPURITIES, SYMMETRY (CRYSTAL  
LOGRAPHY), THEORY, MEASUREMENT, TABLES, PREP  
ARATION, EXPERIMENTAL DATA.

(U)

IDENTIFIERS: 1963, CHEMICAL COMPOSITION, IONIC  
CONDUCTIVITY.

(U)

THE IONIC CONDUCTIVITY OF KCL-KBR MIXED SINGLE  
CRYSTALS AS A FUNCTION OF THE COMPOSITION AND THERMAL  
TREATMENT OF THE SAMPLES HAS BEEN STUDIED. THE  
INTRINSIC ACTIVATION ENERGY MINIMIZED AT THE  
COMPOSITION 50/50 MOLE % KCL-KBR, WHILE THE  
INTRINSIC CONDUCTIVITY REACHED A MAXIMUM AT 67/33  
MOLE % KBR-KCL. QUENCHING INCREASED  
EXTRINSIC CONDUCTIVITY OVER THAT OF ANNEALED SAMPLES  
EXCEPT IN COMPOSITIONS NEAR 50/50 MOLE % KCL-  
KBR, WHERE IT DECREASED EXTRINSIC CONDUCTIVITY.  
IT ALSO SLIGHTLY INCREASED INTRINSIC CONDUCTIVITY  
IN ALL COMPOSITIONS. THESE EFFECTS ARE EXPLAINED  
IN TERMS OF STRUCTURAL DEFECTS AND IMPURITIES.  
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-410 593  
IIT RESEARCH INST CHICAGO ILL

A STUDY OF THE TI-ZR-O SYSTEM.

(U)

DESCRIPTIVE NOTE: REPT. FOR 15 MAR 60-30 APR 62,  
JUN 63 38P DOMAGALA, BY R.F.I  
REPT. NO. 2194 11  
CONTRACT: AF33 616 7074  
PROJ: 7022  
TASK: 7022 02  
MONITOR: ARL 63 104

UNCLASSIFIED REPORT

DESCRIPTORS: (\*ALLOYS, PHASE STUDIES),  
(\*TITANIUM ALLOYS, PHASE STUDIES), (\*ZIRCONIUM  
COMPOUNDS, DIOXIDES), (\*TITANIUM COMPOUNDS,  
OXIDES), OXYGEN, TITANIUM, ZIRCONIUM,  
MELTING, HEAT TREATMENT, METALL, QUENCHING  
(COOLING), HIGH TEMPERATURE RESEARCH, X-RAY  
DIFFRACTION ANALYSIS, HARDNESS, CHEMICAL ANALYSIS,  
MICROSTRUCTURE.  
IDENTIFIERS: 1963.

(U)  
(U)

PHASE RELATIONSHIPS ALONG THE VERTICAL SECTION FROM  
TI TO ZR02 AND FROM T10 TO ZR02 WERE  
INVESTIGATED IN THE TI-ZR-O SYSTEM. ARC  
MELTED ALLOYS WERE PREPARED USING HIGH-PURITY INGREDI  
ENTS. SAMPLES WERE ANNEALED, QUENCHED AND  
SUBJECTED TO METALLOGRAPHIC PREPARATION AND STUDY.  
A CURSORY MELTING POINT-COMPOSITION STUDY WAS  
CONDUCTED. APPROXIMATELY 390 DUPLICATE HEAT-  
TREATED SPECIMENS WERE FORWARDED TO ARL FOR  
CORRELATIVE WORK. (AUTHOR)

(U)



UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-411 781

AUBURN RESEARCH FOUNDATION ALA

THE EFFECT OF THICKNESS AND TEMPERING TEMPERATURE  
ON FRACTURE APPEARANCE TRANSITION TEMPERATURE AND  
CRITICAL FRACTURE TOUGHNESS OF HIGH STRENGTH SHEET  
STEEL-PART I.

(U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT. NO. 2,  
MAY 63 12P MAYNOR, HAL W. IMUELLER,

RICHARD E. I

CONTRACT: DA-01-009-ORD-889

UNCLASSIFIED REPORT

DESCRIPTORS: (\*STEEL, FRACTURE (MECHANICS)),  
(\*FRACTOGRAPHY, STEEL), THICKNESS, HEAT  
TREATMENT, TEMPERATURE, TRANSITION TEMPERATURE,  
TOUGHNESS, SHEETS, BRITTLENESS, QUENCHING  
(COOLING), DUCTILITY.

(U)

IDENTIFIERS: 1963, H11 STEEL.

(U)

FRACTURE APPEARANCE TRANSITION TEMPERATURE, OF  
H-11 STEEL WAS OBSERVED TO DECREASE NON LINEARLY  
WITH DECREASING SHEET THICKNESS FOR YIELD STRENGTHS  
OF APPROXIMATELY 160, 200 AND 240 KSI. THE EFFECT  
OF DECREASING SHEET THICKNESS WAS RELATIVELY MORE  
PRONOUNCED IN DEPRESSING FATT THAN WAS THE EFFECT  
OF INCREASING TEMPERING TEMPERATURE. PHENOMENA  
CONSISTING OF GROSS PIN-HOLE DEFORMATION OR BEARING  
FAILURE, RUPTURE THROUGH THE PIN-HOLE AREA, FORMATION  
OF STEPS OF FLAT FRACTURE AND ASYMMETRICAL FRACTURE  
TOPOGRAPHY, FREQUENTLY WERE OBSERVED FOR FRACTURE  
TOUGHNESS SPECIMENS OF 160-KSI YIELD STRENGTH.  
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-422 662

CONNECTICUT UNIV STORRS

METALLURGICAL FACTORS INFLUENCING THE MAGNETIC  
ANALYSIS OF SURFACE HARDENED AND TEMPERED STEEL. (U)

DESCRIPTIVE NOTE: FINAL PROGRESS REPT.,

OCT 63 14P BARTHOLOMEW, EDWARD L. ,JR.;

CONTRACT: DA19 020AMC0233

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*STEEL, MAGNETIC PROPERTIES), (\*AUSTENITE,  
MAGNETIC PROPERTIES), (\*MARTENSITE, MAGNETIC  
PROPERTIES), STRESSES, SURFACES, HARDENING, CARBON,  
CARBIDES, IRON COMPOUNDS, DISTRIBUTION, QUENCHING  
(COOLING), HEAT TREATMENT, MICROSTRUCTURE, ELECTRON  
MICROSCOPY, SURFACE PROPERTIES (U)

IDENTIFIERS: 1963, H-8620 STEEL, RESIDUAL STRESSES,  
CASE HARDENING, TEMPERING (U)

AN ELECTRON MICROSCOPE STUDY OF MICROSTRUCTURAL  
CHANGES INDUCED BY PROGRESSIVE TEMPERING OF  
CARBURIZED, OIL QUENCHED, REFRIGERATED (-100 F)  
AND UNREFRIGERATED 1/8 - X 3/4 - X 3/4 -IN. SPECIMENS  
OF H-8620 STEEL SHOWED A SIGNIFICANT MAGNETIC  
CHANGE TO ACCOMPANY THE APPEARANCE OF PERCARBIDES IN  
MARTENSITE PLATES WHILE RETAINED AUSTENITE AND  
RESIDUAL STRESS HAVE REMAINED UNCHANGED. RETAINED  
AUSTENITE WAS FOUND TO INFLUENCE MAGNETIC  
MEASUREMENTS. DISTRIBUTIONS FROM SURFACE INTO CORE  
WERE DETERMINED FOR RETAINED AUSTENITE AND RESIDUAL  
STRESS RESULTING FROM 1650 F, 1 1/2 HOUR  
CARBURIZING (SOILD) FOLLOWED BY OIL QUENCHING,  
BRINE QUENCHING, OIL QUENCHING AND REFRIGERATING AT -  
100 F, AND LIQUID NITROGEN QUENCHING FOR BOTH 1/8 -  
AND 1/4 - IN. THICK SPECIMENS. ALL ATTEMPTS TO  
EFFECT RESIDUAL STRESS RELAXATION BY EXPOSURE TO A  
MAGNETIC FIELD WERE UNSUCCESSFUL. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-423 251  
ROCK ISLAND ARSENAL ILL

EXPERIMENTAL HEAT TREATMENT OF M-60 MACHINE GUN  
BOLTS,

(U)

AUG 63 21P GOETTSCH, P. E. ;  
REPT. NO. RIA-63-2761

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*GUN COMPONENTS, STEEL), (\*STEEL, PHYSICAL  
PROPERTIES), HEAT TREATMENT, ALLOYS, QUENCHING  
(COOLING), OILS, SALTS (U)  
IDENTIFIERS: 1963, MACHINE GUN BOLTS, M-60 GUNS (U)

PRESENTED IS THE DEVELOPMENT AND TESTING OF  
CARBURIZING AND HEAT TREATING PROCEDURES FOR A SERIES  
OF EXPERIMENTAL M-60 MACHINE GUN BOLTS  
MANUFACTURED OF 9310 ALLOY STEEL. ACCEPTABLE CASE  
AND CORE PROPERTIES WERE OBTAINED WITH MINIMUM HEAT  
TREAT DISTORTION BY QUENCHING THE SUBJECT BOLTS  
DIRECT FROM A 1700 F GAS CARBURIZING TREATMENT INTO  
A STILL SALT BATH AT 400 F, FOLLOWED BY -100 F  
REFRIGERATING AND 350 F TEMPERING TREATMENTS.  
COMPARATIVE LOW TEMPERATURE IMPACT DATA WERE  
OBTAINED ON CARBURIZED 8620 AND 9310 MATERIAL IN OIL  
QUENCHED AND 400 F SALT QUENCHED CONDITIONS.  
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-423 736

BOEING SCIENTIFIC RESEARCH LABS SEATTLE WASH

THE MARTENSITIC TRANSFORMATION IN AN IRON : 14.5  
PERCENT CHROMIUM : 4.5 PERCENT NICKEL ALLOY, (U)

AUG 63 27P  
REPT. NO. 1 82 0281  
PROJ: 1 82 0281

BLACKBURN, MARTIN J. I

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: ALSO AVAILABLE FROM THE AUTHOR.

DESCRIPTORS: (\*MARTENSITE, TRANSFORMATIONS), (\*IRON  
ALLOYS, PHASE STUDIES), CHROMIUM ALLOYS, NICKEL ALLOYS,  
MICROSTRUCTURE, ELECTRON MICROSCOPY, HEAT TREATMENT,  
QUENCHING (COOLING), COLD WORKING, DEFORMATION,  
AUSTENITE, CRYSTAL LATTICES, SHEAR STRESSES, SYMMETRY  
(CRYSTALLOGRAPHY), CRYSTAL LATTICE DEFECTS (U)  
IDENTIFIERS: (\*MARTENSITE, TRANSFORMATIONS),  
(\*IRON ALLOYS, PHASE STUDIES), CHROMIUM ALLOYS,  
NICKEL ALLOYS, MICROSTRUCTURE, ELECTRON  
MICROSCOPY, HEAT TREATMENT, QUENCHING + COOLING,  
COLD WORKING, DEFORMATION, AUSTENITE, CRYSTAL  
LATTICES, SHEAR STRESSES,  
SYMMETRY (CRYSTALLOGRAPHY), CRYSTAL LATTICE  
DEFECTS (U)

TRANSMISSION ELECTRON MICROSCOPY WAS USED TO  
STUDY THE PHASES AND MICROSTRUCTURAL CHANGES PRODUCED  
BY VARIOUS HEAT TREATMENTS IN AN FE : CR : NI  
ALLOY. TWO TYPES OF MARTENSITE WERE IDENTIFIED IN  
THIS SYSTEM. NEEDLES OF B.C.C. ALPHA - MARTENSITE  
ARE FORMED IN SLOWLY COOLED OR QUENCHED SPECIMENS.  
A SMALL NUMBER OF PLATES OF EPISILON - MARTENSITE  
ARE PRODUCED BY DEFORMATION AT ROOM TEMPERATURE.  
TEMPERING AT TEMPERATURES UP TO 600 C PRODUCES A  
DISPERSION OF THE CARBIDE M<sub>23</sub>C<sub>6</sub> IN THE B.C.C.  
MATRIX. SOME FACTORS CONTROLLING THE MARTENSITE  
AND AUSTENITE IN THE MICROSTRUCTURE ARE DISCUSSED.  
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-423 807

UNITED STATES STEEL CORP PITTSBURGH PA

EVALUATION OF THE HARDENABILITY, TEMPERABILITY, AND  
MECHANICAL PROPERTIES OF TEN 5NI-CR-MO STEELS. (U)

DESCRIPTIVE NOTE: PROGRESS REPT.,

SEP 63 IV MANGANELLO, S. J. PORTER, L.  
F. I

REPT. NO. 511109 I

CONTRACT: NORS88540

PROJ: 40 18 001 9, SR007 01 01

TASK: 853

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (STEEL, MECHANICAL PROPERTIES), (METAL  
PLATES, STEEL), HARDENING, SUBMARINE HULLS, MANGANESE,  
CHROMIUM, MOLYBDENUM, VANADIUM, HEAT TREATMENT,  
QUENCHING (COOLING), MARTENSITE, MICROSTRUCTURE,  
BRITTLINESS, TOUGHNESS, AUSTENITE, CHEMICAL ANALYSIS,  
FRACTURE (MECHANICS), NICKEL ALLOYS, CHROMIUM ALLOYS,  
CHROMIUM ALLOYS, MOLYBDENUM ALLOYS, TEMPERATURE,  
BAINITE, EXPERIMENTAL DATA (U)  
IDENTIFIERS: 1963, HY-130/150 STEEL, 5NI-CR-MO STEEL,  
CHARPY V-NOTCH (U)

PREVIOUS STUDIES TO DEVELOP AN HY-130/150  
SUBMARINE-HULL STEEL INDICATED THAT A QUENCHED AND  
TEMPERED NI-CR-MO OR NI-CR-MO-V STEEL  
CONTAINING ABOUT 5% NI APPEARED VERY PROMISING  
FOR THIS APPLICATION. HOWEVER, THE HARDENABILITY  
OF THE STEELS STUDIED WAS TOO LOW FOR 4-IN. THICK  
PLATES, AND THE TEMPERABILITY OF THE STEELS WITHOUT  
VANADIUM WAS UNSATISFACTORY. THEREFORE, THE  
EFFECTS OF VARIATIONS IN MANGANESE, CHROMIUM,  
MOLYBDENUM, AND VANADIUM ON THE HARDENABILITY,  
MECHANICAL PROPERTIES, AND TEMPERABILITY OF TEN  
VACUUM-MELTED, VACUUM-CARBON-DEOXIDIZED 5NI-CR-  
MO STEELS WERE DETERMINED ON 1/2-IN. THICK PLATES  
THAT WERE WATER-QUENCHED FROM 1500 F AND TEMPERED  
TO SIMULATE LIGHT-GAGE PLATES AND THAT WERE BLOWER-  
COOLED FROM 1500 F AND TEMPERED TO SIMULATE THE  
HEAT TREATMENT AT THE MIDTHICKNESS OF A WATER-  
QUENCHED 4-IN. THICK PLATE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-423 811

UNITED STATES STEEL CORP PITTSBURGH PA

SIMULATION OF THE COOLING OF A WATER-QUENCHED 4-INCH-THICK PLATE. (U)

DESCRIPTIVE NOTE: PROGRESS REPT.,  
SEP 63 IV MANGANELLO, S. J. PORTER, L.  
F. ISITKO, R. J. I  
REPT. NO. S11105  
CONTRACT: NOBS88540  
PROJ: 40 18 001 8, SR007 01 01  
TASK: 853

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*STEEL, QUENCHING (COOLING)), (\*SUBMARINE HULLS, METAL PLATES), (\*QUENCHING (COOLING), METAL PLATES), SIMULATION, MECHANICAL PROPERTIES, MICROSTRUCTURE, THICKNESS, HEAT TREATMENT, HARDNESS, COOLING, AIR COOLED, BLOWERS (U)  
IDENTIFIERS: 1963, HY-80 STEEL (U)

BECAUSE THE PROPERTIES OF SUBMARINE-HULL STEELS MUST BE DETERMINED IN PLATE THICKNESSES THROUGH 4 IN., AND BECAUSE 4-IN. THICK PLATES CANNOT BE SATISFACTORILY PRODUCED FROM SMALL-SIZE LABORATORY HEATS OF STEEL, A TECHNIQUE WAS REQUIRED THAT WOULD PERMIT SIMULATION OF THE COOLING AT THE MIDTHICKNESS OF WATER-QUENCHED 4-IN. THICK PLATES IN A LIGHT-GAGE PLATE, PREFERABLY 1/2 IN. THICK. A CENTRIFUGAL-BLOWER AND WIND-CHANNEL ARRANGEMENT WAS DEvised THAT COOLED 1/2-IN. THICK PLATES FROM 1500 TO 400 F IN 7 TO 8-1/2 MINUTES FOR THE EXTREMES OF THE POSSIBLE EXPERIMENTAL COOLING CONDITIONS. WHEN THE MECHANICAL PROPERTIES AND MICROSTRUCTURE OF 1/2-IN. THICK PLATES OF HY-80 STEEL, CUT FROM THE CENTER OF A 4-IN. THICK PLATE AND BLOWER-COOLED AFTER AUSTENITIZING, WERE COMPARED WITH THOSE AT THE MIDTHICKNESS OF THE 4-IN. THICK WATER-QUENCHED PLATE, THE RESULTS INDICATED THAT THE BLOWER-COOLED PLATE HAD COOLED ONLY SLIGHTLY SLOWER THAN THE MIDTHICKNESS OF THE 4-INCH-THICK PLATE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-423 812

UNITED STATES STEEL CORP PITTSBURGH PA

FEASIBILITY OF DEVELOPING AN HY-180/210  
WELDMENT.

(U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 1, 1  
JUNE-30 SEP 63,  
SEP 63 1V PORTER, L. F. IRATHBONE, A. M.  
IROLFE, S. T. ILESNEWICH, A. I  
REPT. NO. S20000 1  
CONTRACT: NOBS88540  
PROJ: 40 18 002 8,SS050 000  
TASK: 1567

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*STEEL, WELDING), (\*SUBMARINE HULLS, METAL  
PLATES), (\*WELDING, METAL PLATES), WELDS, MARTENSITE  
(MATERIALS), AGING (MECHANICS), TOUGHNESS, WELDING RODS,  
BRITTLINESS, HOT WORKING, HEAT TREATMENT, QUENCHING  
(COOLING), FEASIBILITY STUDIES, METALLOGRAPHY, ELECTRON  
MICROSCOPY, MICROSCOPY, ELECTRON DIFFRACTION ANALYSIS,  
X-RAY DIFFRACTION ANALYSIS, NICKEL ALLOYS, COBALT  
ALLOYS, MOLYBDENUM ALLOYS, TITANIUM, ALUMINUM,  
MOLYBDENUM, FRACTOGRAPHY, CHEMICAL ANALYSIS, HARDENING,  
MECHANICAL PROPERTIES, EXPERIMENTAL DATA (U)  
IDENTIFIERS: 1963, HY-180/200 STEEL, MARAGING STEEL,  
CHARPY V-NOTCH, 18NI-8CO-MO STEEL, 12NI5G-3MO STEEL,  
HY-80 STEEL (U)

BASE-METAL STUDIES WERE CONCENTRATED ON AN  
EVALUATION OF THE POTENTIAL OF MARAGING STEELS AS  
HY180/210 BASE METALS. THE RESULTS OBTAINED TO  
DATE INDICATE THAT THE MARAGING STEELS, PARTICULARLY  
IN 1- TO 4-IN. THICK PLATES, EXHIBIT POORER NOTCH  
TOUGHNESS THAN QUENCHED AND TEMPERED STEELS AT YIELD  
STRENGTHS IN THE RANGE 150 TO 200 KSI. THE  
EMBRITTLEMENT CAUSING THE REDUCED NOTCH TOUGHNESS IS  
BEING INTENSIVELY INVESTIGATED. ALTHOUGH STUDIES  
TO DETERMINE THE CAUSE AND ELIMINATION OF  
EMBRITTLEMENT WILL BE CONTINUED, STUDIES ON QUENCHED  
AND TEMPERED STEELS, ON STEELS STRENGTHENED BY A  
COMBINATION OF CARBON MARTENSITE AND AGE HARDENING,  
AND ON SPECIAL PROCESSING TECHNIQUES SUCH AS  
AUSFORMING AND RAPID HEAT TREATMENT WILL BE  
ACCELERATED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-423 813

UNITED STATES STEEL CORP PITTSBURGH PA

DEVELOPMENT OF AN HY-130/150 WELDMENT.

(U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 1. 1

JUNE-30 SEP 63,

SEP 63

IV

PORTER, L. F. IRATHBONE, A. M.

IROLF, S. T. ILESNEWICH, A. I

REPT. NO. CONTRACT

PROJ: 40 18 001 12, SRO07 01 01

TASK: 853

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*STEEL, WELDING), (\*SUBMARINE HULLS, METAL PLATES), (\*WELDING, METAL PLATES), WELDS, WELDING RODS, TOUGHNESS, FRACTURE (MECHANICS), COLD WORKING, MATERIAL FORMING, MECHANICAL PROPERTIES, HARDENING, QUENCHING (COOLING), HEAT TREATMENT, CHEMICAL ANALYSIS, BLOWERS, AIR COOLED, EXPERIMENTAL DATA, NICKEL ALLOYS, CHROMIUM ALLOYS, MOLYBDENUM ALLOYS, VANADIUM ALLOYS, MANGANESE, SILICON, ALUMINUM, CARBON (U)

IDENTIFIERS: 1963, HY-130/150 STEEL, HY-80 STEEL, CHARPY V-NOTCH, 5NI-CR-MO STEEL (U)

BASE-METAL STUDIES OF A SERIES OF 5NI-CR-MO LABORATORY STEELS INDICATED THAT A 5NI-0.75MN-0.5CR-0.5MO-0.07V STEEL EXHIBITED AN EXCELLENT COMBINATION OF STRENGTH AND TOUGHNESS, EXCELLENT TEMPERING CHARACTERISTICS, AND ADEQUATE HARDENABILITY FOR A 4-IN. THICK WATER-QUENCHED PLATE. THE RESULTS OF THESE LABORATORY STUDIES ARE SO PROMISING THAT AN 80-TON HEAT OF THE AFOREMENTIONED STEEL WILL BE PRODUCED DURING THE WEEK OF OCTOBER 7, 1963, FOR EXTENSIVE EVALUATION, INCLUDING AN EVALUATION OF ITS COMPATIBILITY WITH THE MOST PROMISING HY-130/150 FILLER METAL. STUDIES OF OTHER TYPES OF HY-130/150 STEELS AND OF THE EFFECT OF MINOR ELEMENTS ON THE PROPERTIES OF HY-130/150 STEELS WILL BE CONTINUED. (AUTHOR) (U)



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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-429 142

UNITED STATES STEEL CORP MONROEVILLE PA

FEASIBILITY OF DEVELOPING AN HY-180/210  
WELDMENT.

(U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 2, 1 OCT-  
31 DEC 63,

JAN 64 23P PORTER, L. F. IRATHBONE, A. M.  
ROLFE, S. T. IDORSCHU, K. E. I

REPT. NO. AAS NP48

CONTRACT: NOBS88540

PROJ: 40 18 002 11,SS050 000

TASK: 1567

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*SUBMARINE HULLS, METAL PLATES), (\*STEEL,  
WELDS), MATERIAL FORMING, TOUGHNESS, QUENCHING  
(COOLING), HEAT TREATMENT, AGING (MATERIALS), HARDENING,  
MARTENSITE, MICROSTRUCTURE, MECHANICAL PROPERTIES,  
FEASIBILITY STUDIES, NICKEL ALLOYS, CHROMIUM ALLOYS,  
MOLYBDENUM ALLOYS, VANADIUM ALLOYS (U)

IDENTIFIERS: 1964, HY-180/210 STEEL, MARAGING  
STEEL (U)

PRELIMINARY STUDIES ON LABORATORY AND PRODUCTION  
EXPERIMENTAL MARAGING STEELS BEING CONSIDERED AS  
HY-180/210 STEELS HAVE DEFINED A NUMBER OF FACTORS  
THAT CAUSED LOW NOTCH TOUGHNESS, AND SEVERAL  
LABORATORY AND PRODUCTION MARAGING STEELS HAVE  
RECENTLY BEEN PRODUCED THAT HAVE SIGNIFICANTLY  
IMPROVED NOTCH TOUGHNESS. FURTHER MODIFICATIONS IN  
COMPOSITION AND PROCESSING PRACTICES ARE BEING  
INVESTIGATED THAT SHOULD LEAD TO THE DEVELOPMENT OF  
MARAGING STEELS WITH EVEN BETTER NOTCH TOUGHNESS.  
SEVERAL QUENCHED AND TEMPERED STEELS AND A STEEL  
STRENGTHENED BY A COMBINATION OF CARBON MARTENSITE  
AND AGE HARDENING APPEAR PROMISING. SEVERAL  
NONCONVENTIONAL PROCESSING PROCEDURES ALSO APPEAR  
PROMISING AS METHODS FOR INCREASING STRENGTH WITH  
LITTLE OR NO LOSS IN NOTCH TOUGHNESS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-429 143

UNITED STATES STEEL CORP MONROEVILLE PA

SUBSTITUTION OF MANGANESE FOR NICKEL IN NI-CR-MO  
STEELS.

(U)

DESCRIPTIVE NOTE: PROGRESS REPT.,

JAN 64 22P DABKOWSKI, D. S. MANGANELLO,

S. J. PORTER, L. F.

REPT. NO. AAS NP36

CONTRACT: NOBS88540

PROJ: 40 18 001 14 ,SR00701 01

TASK: 853

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*SUBMARINE HULLS, METAL PLATES), (\*STEEL,  
HARDENING), NICKEL ALLOYS, CHROMIUM ALLOYS, MOLYBDENUM  
ALLOYS, MANGANESE, MECHANICAL PROPERTIES, QUENCHING  
(COOLING), HEAT TREATMENT

(U)

IDENTIFIERS: 1964, HY-130/150 STEEL

(U)

A LABORATORY STUDY WAS INITIATED IN WHICH THE  
MANGANESE CONTENT OF SIX NI-CR-MO STEELS WAS  
INCREASED FROM 0.5 TO 3.0% AND THE NICKEL CONTENT  
WAS DECREASED FROM 4.5 TO 0.5% TO MAINTAIN A  
CALCULATED HARDENABILITY INDEX OF 15 TO 20. THE  
EVALUATION CONSISTED OF HARDENABILITY, MECHANICAL-  
PROPERTY, AND TEMPERABILITY STUDIES ON WATER-QUENCHED  
AND ON BLOWER-COOLED 1/2-IN.-THICK PLATES OF THE SIX  
VACUUM-MELTED, VACUUM-CARBONDEOXIDIZED MN-NI-  
CR-MO STEELS. THE RESULTS SHOWED THAT THE  
HARDENABILITY OF THE HIGHERMANGANESE STEELS (1.0 TO  
3.0% MN) WAS LESS THAN THAT PREDICTED FROM THE  
CALCULATIONS, AND THE NOTCH TOUGHNESS OF THE WATER-  
QUENCHED AND OF THE BLOWER-COOLED PLATES DECREASED  
CONTINUOUSLY AS THE MANGANESE CONTENT INCREASED.  
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-429 447

UNITED STATES STEEL CORP MONROEVILLE PA

PRODUCTION AND PROPERTIES OF 5NI-CR-MO-V STEEL  
PLATES,

(U)

JAN 64 IV MANGANELLO, S. J. PORTER, L.  
F. ILOVEDAY, G. E.  
CONTRACT: NOBS88540  
PROJ: 40 18 001 16, SR007 01 01  
TASK: 853

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*SUBMARINE HULLS, STEEL), (\*STEEL,  
MATERIAL FORMING), MELTING, CASTING, RARE EARTHS,  
ROLLING (METALLURGY), MECHANICAL PROPERTIES, NICKEL  
ALLOYS, CHROMIUM ALLOYS, MOLYBDENUM ALLOYS, VANADIUM  
ALLOYS, HEAT TREATMENT, QUENCHING (COOLING), TENSILE  
PROPERTIES, TOUGHNES, MICROSTRUCTURE, CHEMICAL ANALYS(U)  
IDENTIFIERS: 1964, 5NI-CR-MO-V STEEL, HY-130/150  
STEEL (U)

AN 80-T05, BASIC-ELECTRIC-FURNACE, FIVE-INGOT HEAT  
OF A 5NI-CR-MO-V STEEL CONSIDERED PROMISING  
AS AN HY-130/150 STEEL WAS PRODUCED TO PROVIDE  
MATERIAL FOR EVALUATION OF ITS SUITABILITY AS AN HY-  
130/150 WELDMENT AND TO PROVIDE MATERIAL TO THE  
MARINE ENGINEERING LABORATORY FOR AN EVALUATION  
OF THE EFFECT OF THE ADDITION OF RARE EARTHS ON THE  
PROPERTIES OF A SUBMARINE-HULL-TYPE STEEL HAVING A  
MINIMUM YIELD STRENGTH OF 140 KSI. THE RESULTS OF  
THE PRODUCTION AND PROPERTIES OF THE 5NI-CR-MO-  
V STEEL ARE SUMMARIZED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-430 353

GENERAL DYNAMICS/FORT WORTH TEX

SURFACE TRANSFORMATIONS IN AN IMPACTED STEEL ROD,

(U)

JUL 63 20P POTTER, R. D. ;  
REPT. NO. ERR FW213  
CONTRACT: AF33 657 11214

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*STEEL, TRANSFORMATIONS), (\*IMPACT SHOCK,  
STEEL), MICROSTRUCTURE, MARTENSITE, ABLATION, SURFACES,  
RODS, PLASTICITY, HARDNESS, HEATING, QUENCHING  
(COOLING), TIME (U)  
IDENTIFIERS: 1964, 1035 STEEL, FERRITE (IRON) (U)

A SAE 1035 STEEL WAS IMPACTED ON ITS END, RESULTING  
IN ABLATION OF THE STEEL SURFACE BY A HIGHLY PLASTIC  
MATERIAL FLOWING UNDER THE IMPACT EFFECT AND CAUSING  
HIGH RATE TRANSFORMATIONS OF THE STEEL'S  
MICROSTRUCTURE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-430 911

MANLABS INC CAMBRIDGE MASS

THERMOMECHANICAL TREATMENTS APPLIED TO ULTRAHIGH-STRENGTH BAINITES.

(U)

DESCRIPTIVE NOTE: PROGRESS REPT. NO. 5, 15 OCT-15 DEC 63.

DEC 63 28P

CONTRACT: N600 19 59811

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (STEEL, TRANSFORMATIONS), (TOOL STEEL, HARDENING), CHROMIUM ALLOYS, IRON ALLOYS, AUSTENITE, BAINITE, MARTENSITE, HEAT TREATMENT, DEFORMATION, MECHANICAL WORKING, TEMPERATURE, COLD WORKING, HOT WORKING, QUENCHING (COOLING), CRYSTAL STRUCTURE, MICROSTRUCTURE, CRYOGENICS, ELECTRON MICROSCOPY, MICROSCOPY, X-RAY DIFFRACTION ANALYSIS, METALLOGRAPHY,

MECHANICAL PROPERTIES

(U)

IDENTIFIERS: 1963, H11 STEEL, 4350 STEEL

(U)

RETAINED AUSTENITE DETERMINATIONS WERE MADE IN H11 WHICH HAD BEEN SUBJECTED TO VARIOUS THERMAL AND THERMOMECHANICAL TREATMENTS. IT WAS FOUND THAT UP TO 35% AUSTENITE IS RETAINED WHEN BAINITE IS FORMED AT 550 F FROM EITHER DEFORMED OR UNDEFORMED AUSTENITE. FOR TEMPERING TEMPERATURES BELOW 1000 F, RETAINED AUSTENITE HAS A CONSIDERABLE EFFECT ON THE YIELD STRENGTH OF THE MIXED STRUCTURE. THE INFLUENCE OF RETAINED AUSTENITE ON THE YIELD STRENGTH IS NOT DIRECTLY PROPORTIONAL TO ITS VOLUME PERCENT.

(AUTHOR)

(U)

UNCLASSIFIED

ODC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-432 999

MASSACHUSETTS INST OF TECH CAMBRIDGE

INVESTIGATION OF SOLIDIFICATION OF HIGH STRENGTH  
STEEL CASTINGS.

(U)

DESCRIPTIVE NOTE: INTERIM SUMMARY REPT., 9 DEC 61-8  
DEC 62.

DEC 63 51P

CONTRACT: DA-19-020-ORD-5443

PROJ: 1A024401A110

MONITOR: AMRA

CR63 04 1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*STEEL, CASTINGS), (\*CRYSTALLIZATION,  
STEEL), IRON ALLOYS, NICKEL ALLOYS, MELTING, COOLING,  
QUENCHING (COOLING), CRYSTAL STRUCTURE, GRAIN STRUCTURE  
(METALLURGY), METALLOGRAPHY, CRYSTAL GROWTH,  
MICROSTRUCTURE, POROSITY, ETCHED CRYSTALS, SOLIDS,  
FREEZING, DIFFUSION, NICKEL, DISTRIBUTION, TEMPERATURE,  
TIME, HIGH TEMPERATURE RESEARCH (U)  
IDENTIFIERS: 1963, ELECTRON MICROPROBE,  
MICROPOROSITY (U)

A FURNACE WITH RELATED APPARATUS FOR FULLY  
CONTROLLING SOLIDIFICATION IN SMALL SAMPLES OF IRON-  
BASE ALLOYS WAS COMPLETED AND INSTALLED. STUDIES  
WERE CONDUCTED USING THE EQUIPMENT TO STUDY  
SOLIDIFICATION OF AN IRON-NICKEL ALLOY. EMPHASIS OF  
THE WORK WAS ON EFFECT COOLING RATE ON DETAILS OF  
DENDRITE MORPHOLOGY AND ON MICROSEGREGATION IN A  
SOLUTE-RICH SYSTEM. AT HIGHER COOLING RATES, THERE  
IS A TENDENCY FOR FORMATION OF "PRIMARY PLATES"  
(FILLING IN OF INTERSTICES BETWEEN PRIMARY AND  
SECONDARY ARMS DURING THE EARLY STAGES OF  
SOLIDIFICATION). AT LOWER COOLING RATES, THERE IS  
A TENDENCY FOR FORMATION OF SECONDARY PLATES  
(FILLING IN OF INTERSTICES BETWEEN SECONDARY AND  
TERTIARY DENDRITE ARMS). DENDRITE ARM SPACING  
INCREASES LINEARLY WITH THE RECIPROCAL OF THE SQUARE  
ROOT OF THE COOLING RATE. SECONDARY AND TERTIARY  
ARM SPACINGS ARE ROUGHLY EQUIVALENT. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-435 779

COLUMBIA UNIV NEW YORK SCHOOL OF ENGINEERING AND APPLIED  
SCIENCE

STUDY ON YIELDING OF IRON,

(U)

FEB 64 122P LEE, EUN U. ;  
REPT. NO. TR4  
CONTRACT: NONR26661

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: DOCTORAL THESIS.

DESCRIPTORS: (IRON, MECHANICAL PROPERTIES), (QUENCHING  
(COOLING), TEMPERATURE), CARBON, TENSILE PROPERTIES,  
GRAIN STRUCTURES (METALLURGY), INTERNAL FRICTION, GRAIN  
BOUNDARIES, THEORY, AGING (MATERIALS), STRAIN  
(MECHANICS), SOLUBILITY, SOLID SOLUTIONS, CRYSTAL  
LATTICE DEFECTS, HEAT TREATMENT (U)  
IDENTIFIERS: 1964, PEIERLS-NABARRO STRESS (U)

THE EFFECT OF QUENCHING ON THE YIELD STRESS OF IRON  
WAS STUDIED AT EXTREMELY SMALL CARBON CONCENTRATIONS.  
SWEDISH IRON WIRE SPECIMENS OF VARIOUS GRAIN SIZES  
WERE DECARBURIZED UNTIL THEY SHOWED NO YIELD POINT OR  
STRAIN-AGING 170 HOURS OF WET-HYDROGEN TREATMENT AT  
716 C). AFTERWARDS THEY WERE RECARBURIZED IN AN  
ATMOSPHERE OF NORMAL HEPTANE AND DRY-HYDROGEN AT 716  
C AND QUENCHED FROM VARIOUS TEMPERATURES, RANGING  
FROM 130 TO 730 C, INTO ROOM-TEMPERATURE WATER, AND  
TENSILE TESTED. CARBON CONTENTS WERE MEASURED BY  
THE INTERNAL FRICTION TECHNIQUE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-456 330

UNITED STATES STEEL CORP MONROEVILLE PA APPLIED RESEARCH  
LAB

RAPID HEAT TREATMENT OF 5NI-CR-MO-V STEEL, (U)

DEC 64 IV HAAK, R. P. IKRAMER, K. H. ;  
PORTER, L. F. IZABELSKY, R. W. I  
CONTRACT: NOBS88540  
PROJ: SS050 000 ,USS PROJ.40 018 002 24  
TASK: 1567

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*STEEL, HEAT TREATMENT), MECHANICAL  
PROPERTIES, TENSILE PROPERTIES, TEMPERATURE, QUENCHING  
(COOLING), EXPERIMENTAL DATA (U)  
IDENTIFIERS: CHARPY IMPACT TEST, STEEL CR-MO5NI-V,  
STEEL HY-130/150 (U)

BECAUSE A PREVIOUS STUDY SHOWED THAT THE YIELD  
STRENGTH AND TOUGHNESS OF CONVENTIONALLY QUENCHED AND  
TEMPERED STEELS WOULD BE SIGNIFICANTLY IMPROVED BY  
RAPID AUSTENITIZING, A STATISTICALLY DESIGNED PROGRAM  
WAS INITIATED TO EVALUATE RAPIDHEAT-TREATMENT  
VARIABLES. THE EFFECT OF PRIOR MICROSTRUCTURE  
(AS-ROLLED AND AS-QUENCHED), HEATING RATE (2,  
10, AND 200 F PER SECOND), NUMBER OF  
AUSTENITIZING PASSES (1 AND 5), PEAK  
AUSTENITIZING TEMPERATURE (1400, 1550, AND 1700  
F), HOLDING TIME AT PEAK TEMPERATURE (10 TO 15  
AND 50 TO 70 SECONDS), AND TEMPERING TEMPERATURE  
(UNTEMPERED, 400, 700, AND 1000 F) ON THE  
MECHANICAL PROPERTIES OF THE 5NI-CR-MO-V  
EXPERIMENTAL HY130/150 STEEL WERE DETERMINED AND  
COMPARED WITH THOSE OF CONVENTIONALLY HEAT-TREATED  
5NI-CR-MO-V STEEL. THE STATISTICAL  
ANALYSIS OF THE DATA PREDICTED THAT THE 5NI-CR-  
MO-V STEEL WILL EXHIBIT A YIELD STRENGTH OF 185  
KSI, A TENSILE STRENGTH OF 204 KSI, AN ELONGATION OF  
17%, A REDUCTION OF AREA OF 68 PERCENT, AND A  
CHARPY ENERGY ABSORPTION AT 80 F OF 70 FT-LB WHEN  
AS-ROLLED MATERIAL IS RAPIDLY AUSTENITIZED 5 TIMES  
AT 200 F PER SECOND TO A PEAK TEMPERATURE OF 1400  
F, WATER-QUENCHED, AND CONVENTIONALLY TEMPERED AT  
360 F. (AUTHOR) (U)



UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZONCI

AD-459 672

UNITED STATES STEEL CORP MONROEVILLE PA APPLIED RESEARCH  
LAB

EFFECT OF COMPOSITION AND HEAT TREATMENT ON THE  
MECHANICAL PROPERTIES OF NI-CR-MO SUBMARINE-HULL  
STEELS - I.

(U)

DESCRIPTIVE NOTE: TECHNICAL PROGRESS REPT.,  
MAY 63 30P MANGANELLO, S. J. PORTER, L.  
F. ;

REPT. NO. S-11109  
CONTRACT: NOBS88540  
PROJ: 40 18 001 4

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•SUBMARINE HULLS, STEEL), (•STEEL,  
MECHANICAL PROPERTIES), CHEMICAL ANALYSIS, HEAT  
TREATMENT, HARDNESS, TOUGHNESS, MICROSTRUCTURE,  
QUENCHING (COOLING), SHIP PLATES

(U)

IDENTIFIERS: STEEL HY-130/150, CHEMICAL COMPOSITION,  
NOTCH TOUGHNESS, TEMPERING

(U)

PREVIOUS STUDIES TO DEVELOP A SUBMARINE-HULL STEEL  
THAT WOULD MEET THE U. S. NAVY REQUIREMENTS FOR AN  
HY-130/150 STEEL INDICATED THAT A 5 1/4NI-CR-  
MO-V STEEL APPEARED PROMISING EXCEPT THAT THE  
HARDENABILITY OF THIS STEEL WAS TOO LOW FOR USE AS 4-  
IN.-THICK PLATES. THEREFORE, A PRELIMINARY STUDY  
WAS INITIATED ON 5NI-CR-MO STEELS TO ESTABLISH  
THE RANGE OF HARDENABILITIES REQUIRED TO OBTAIN THE  
DESIRED MICROSTRUCTURE AND MECHANICAL PROPERTIES IN  
1/2-IN.-THICK PLATES AIR-COOLED TO SIMULATE THE  
COOLING AT THE CENTER OF A WATER-QUENCHED PLATE ABOUT  
6 INCHES THICK. THE RESULTS SHOWED THAT THE YIELD  
STRENGTHS OF 1/2-IN.-THICK AIR-COOLED PLATES WERE  
SIGNIFICANTLY LOWER THAN THOSE OF 1/2-IN.-THICK WATER-  
QUENCHED PLATES WHEN THE HARDENABILITY INDEX WAS  
ABOUT 15, BUT THAT THE YIELD STRENGTHS OF THE AIR-  
COOLED PLATES WERE ONLY SLIGHTLY LOWER THAN THOSE OF  
THE WATER-QUENCHED PLATES AT HARDENABILITY INDICES OF  
29 AND HIGHER. HOWEVER, EVEN AT THE HIGHER  
HARDENABILITY VALUES, THE NOTCH TOUGHNESS OF THE  
AIRCOOLED PLATES WAS SIGNIFICANTLY LOWER THAN THAT OF  
THE WATER-QUENCHED PLATES. (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-466 276

PRINCETON UNIV N J DEPT OF AEROSPACE AND MECHANICAL  
SCIENCES

SOLID PROPELLANT COMBUSTION MECHANISM STUDIES. (U)

DESCRIPTIVE NOTE: PROGRESS REPT. NO. 18, 1 OCT-31 DEC  
64,

JUN 65 14P STEINZ, JOHAN A. ;

SUMMERFIELD, MARTIN ;

REPT. NO. 446Q

CONTRACT: NONR1050 32

PROJ: NR092 516

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (SOLID ROCKET PROPELLANTS, BURNING  
RATE), LOW-PRESSURE RESEARCH, COMBUSTION PRODUCTS,  
QUENCHING(COOLING), THERMAL CONDUCTIVITY,  
KINETIC THEORY, SURFACE PROPERTIES, PHASE STUDIES,  
SOLIDS, GASES, PYROLYSIS, MATHEMATICAL  
ANALYSIS (U)

IN GENERAL, AT SUFFICIENTLY LOW PRESSURE, QUENCHING  
TAKES PLACE. HOWEVER, IT HAS BEEN OBSERVED THAT  
AP POLYSULFIDE PROPELLANTS DO NOT QUENCH BUT  
DISPLAY INSTEAD A TRANSITION, AS THE PRESSURE IS  
LOWERED, FROM THE 'NORMAL' MODE OF COMBUSTION  
EXHIBITING A VISIBLE FLAME TO ONE WHERE NO FLAME IS  
VISIBLE AND A POROUS ASH REMAINS AS A COMBUSTION  
PRODUCT. QUENCHING IS ORDINARILY EXPLAINED BY A  
HEAT LOSS EFFECT, BUT THE OCCURRENCE OF THIS  
UNQUENCHED, FLAMELESS BURNING SEEMED TO REQUIRE SOME  
DEEPER EXPLANATION. IT IS SUGGESTED THAT THE  
CONTINUATION OF BURNING AT LOW PRESSURES IS DUE TO  
THE INHIBITION OF THE LOSS OF HEAT TO THE  
SURROUNDINGS BY THE RETAINED ASH. AN ANALYSIS  
BASED ON THIS HYPOTHESIS SHOWS THAT, EVEN WITHOUT THE  
INSULATING EFFECT OF THE ASH, STEADY BURNING IS  
POSSIBLE ALL THE WAY DOWN TO ZERO PRESSURE, PROVIDED  
THE GASIFICATION PROCESS AT THE SOLID SURFACE IS  
EXOTHERMIC, AND PROVIDED THE ACTIVATION ENERGY FOR  
THIS PROCESS IS SMALL. CONVERSELY, FOR ENDOTHERMIC  
PROCESSES OR FOR LARGE ACTIVATION ENERGIES, QUENCHING  
WILL OCCUR WHEN THERE IS NO INSULATING ASH. THUS,  
THE STUDY OF LOW PRESSURE BURNING OPENS UP THE  
POSSIBILITY OF MEASURING THE HEAT OF GASIFICATION AT  
THE SURFACE AND THE ACTIVATION ENERGY FOR THE  
GASIFICATION PROCESS. ON THE EXPERIMENTAL SIDE,  
BEFORE SUCH DEDUCTIONS ARE POSSIBLE. (U)

33  
UNCLASSIFIED

/ZOHCI

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMCI

AD-470 827

AEROJET-GENERAL CORP SACRAMENTO CALIF

TERNARY PHASE EQUILIBRIA IN TRANSITION METAL-BORON-CARBON-SILICON SYSTEMS. ART II. TERNARY SYSTEMS.  
VOL. 1. TA-HF-C SYSTEM.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,

JUN 65 84P RUDY, E. I

CONTRACT: AF33 615 1249

PROJ: AF7350

TASK: 735001

MONITOR: AFML TR-65-2-PT-2-VOL-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (PHASE STUDIES, TRANSITION METALS),  
(TRANSITION METALS, PHASE STUDIES), TANTALUM,  
HAFNIUM, CARBON, TANTALUM ALLOYS, HAFNIUM  
ALLOYS, CARBON ALLOYS, CHEMICAL ANALYSIS, HEAT,  
X-RAY DIFFRACTION ANALYSIS, METALLOGRAPHY,  
MELTING, HEAT TREATMENT, HIGH-TEMPERATURE  
RESEARCH, QUENCHING(COOLING), CARBIDES,  
SILVER, IMPURITIES, CRYSTAL LATTICES

(U)

IDENTIFIERS: DIFFERENTIAL THERMAL ANALYSIS

(U)

THE TERNARY ALLOY SYSTEM TANTALUM-HAFNIUM-CARBON  
WAS INVESTIGATED BY MEANS OF X-RAY, DTA, MELTING  
POINT, AND METALLOGRAPHIC TECHNIQUES ON CHEMICALLY  
ANALYZED ALLOYS, AND A COMPLETE PHASE DIAGRAM FOR  
TEMPERATURE ABOVE 1000 C WAS ESTABLISHED. THE  
SYSTEM IS CHARACTERIZED BY A VERY HIGH MELTING SOLID  
SOLUTION OF THE REFRACTORY MONOCARBIDES IN BOTH  
BINARY SYSTEMS, AND A LIMITED EXCHANGE OF HAFNIUM IN  
THE LOW- AND HIGH-TEMPERATURE MODIFICATION OF  
TA2C. FOUR CLASS II FOUR-PHASE REACTION  
PLANES AS WELL AS THREE LIMITING TIE LINES OCCUR IN  
THE CONCENTRATION AREA METAL-MONOCARBIDE SOLUTION.  
THE RESULTS OF THIS INVESTIGATION ARE DISCUSSED AND  
COMPARED WITH PREVIOUS, PARTIAL INVESTIGATIONS OF  
THIS SYSTEM. FIELDS OF APPLICATION ARE OUTLINED.  
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-476 857 11/6  
NAVAL AIR ENGINEERING CENTER PHILADELPHIA PA AERONAUTICAL  
MATERIALS LAB

APPLICATION OF POTENTIOSTATIC AND GALVANOSTATIC  
TECHNIQUES TO THE STUDY OF INTERGRANULAR CORROSION IN  
HIGH STRENGTH ALUMINUM ALLOYS. (U)

DESCRIPTIVE NOTE: FINAL REPT. JAN 64-JUN 65,  
OCT 65 29P KETCHAM, SARA J. I  
PROJ: NAEC-AML(18)-R360FR101

UNCLASSIFIED REPORT

DESCRIPTORS: (•ALUMINUM ALLOYS, •CORROSION), GRAIN  
STRUCTURES(METALLURGY), HEAT TREATMENT,  
QUENCHING(COOLING), ELECTROCHEMISTRY, STRESSES,  
STRESS CORROSION, POLARIZATION, COPPER ALLOYS,  
MAGNESIUM ALLOYS, ANODES(ELECTROLYTIC CELL),  
CATHODES(ELECTROLYTIC CELL), MICROSTRUCTURE (U)  
IDENTIFIERS: ALUMINUM ALLOY 2024 (U)

THE EFFECT OF SLOW QUENCHING FOLLOWING SOLUTION  
HEAT TREATMENT ON NATURALLY AGED AL-CU-MG ALLOY  
CAN BE DETECTED BY CORROSION POTENTIALS AND  
ACCELERATED CORROSION TESTS FOR INTERGRANULAR  
CORROSION AND STRESS CORROSION SUSCEPTIBILITY.  
FASTER QUENCHING RATES GIVE NO INDICATION OF THE  
EXISTENCE OF ANY CONTINUOUS ANODIC PATHS UNTIL A  
STRESS IS APPLIED. A POSSIBLE MECHANISM FOR THIS  
IS PROPOSED BASED ON THE ELECTROCHEMICAL EFFECT OF  
STRESS WHICH IS BELIEVED TO BE THE RESULT OF STRAIN  
INDUCED DEPOLARIZATION OF THE ANODIC PHASE OR PHASES  
AND STRESS INDUCED INCREASE IN THE SURFACE ACTIVITY  
OF HYDROGEN IONS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMCI

AD-479 783 1176 13/8  
ALCOA RESEARCH LABS ALUMINUM CO OF AMERICA NEW KENSINGTON  
PA

DEVELOPMENT OF ALUMINUM-BASE ALLOYS-SECTION II. (U)

DESCRIPTIVE NOTE: FINAL REPT. 29 SEP 61-30 SEP 65,  
DEC 65 105P HAARR, A. P. I  
REPT. NO. 13-65-AP59-S-SECT-2  
CONTRACT: DA-36-034-ORD-3559RD  
PROJ: DA-593-32-004

UNCLASSIFIED REPORT

DESCRIPTORS: (ALUMINUM ALLOYS, OPTIMIZATION),  
(POWDER METALLURGY, MATERIAL FORMING), OXIDES,  
ALUMINUM COMPOUNDS, TENSILE PROPERTIES, EXTRUSION,  
COLD WORKING, DENSITY, SINTERING, CONTROLLED  
ATMOSPHERES, ARGON, HOT WORKING, FORGING,  
QUENCHING(COOLING), ROLLING(METALLURGY),  
CONFIGURATION, WELDABILITY, POROSITY, SHEETS,  
TEMPERATURE, PARTICLE SIZE, HEAT TREATMENT,  
DIES, QUANTITATIVE ANALYSIS, METALS,  
AGING(MATERIALS), RODS (U)  
IDENTIFIERS: HOT PRESSING, HOT COINING, IMPACT  
EXTRUSION, COMPACTS, ALUMINUM OXIDE (U)

THE DEVELOPMENT OF PROCESSES FOR MAKING HIGH-  
STRENGTH, HIGH QUALITY PRODUCTS FROM PREALLOYED  
ATOMIZED AL POWDERS IS DESCRIBED. HIGH QUALITY,  
HIGH-STRENGTH 2 IN. DIA. HEAT TREATABLE EXTRUSIONS  
HAVE BEEN PRODUCED BY ALUMINUM POWDER METALLURGY  
METHODS. COMPACTS WERE PRODUCED EITHER BY COLD  
COMPACTING-HOT COINING OR BY HOT PRESSING OF  
PREHEATED POWDERS. THE TENSILE PROPERTIES OF THE  
COMPACTS AFTER HEAT TREATING WERE LOWER THAN THE HEAT  
TREATED 2 IN. DIA. EXTRUSIONS. THE PROPERTIES OF  
DUPLICATE SPECIMENS ALSO LACKED THE UNIFORMITY WHICH  
WAS PRESENT FOR THE EXTRUSIONS. COLD COMPACTED AND  
SINTERED MATERIAL HAD EXTREMELY LOW TENSILE  
PROPERTIES. FORGING AND HOT UPSETTING IN A CLOSED  
DIE HAVE RESULTED IN THE TENSILE STRENGTHS BEING  
INCREASED TO APPROXIMATELY THE LEVEL OF EXTRUDED  
STOCK. SHEET PRODUCED FROM FORGED MATERIAL ALSO  
HAD HIGH PROPERTIES. THE WORKING TEMPERATURE OF  
THESE ALLOYS IS EXTREMELY IMPORTANT. ALTHOUGH THE  
WELDABILITY OF THESE ALLOYS IS BETTER THAN THE AL-  
AL203 ALLOYS, THE POROSITY IS STILL TOO HIGH FOR  
COMMERCIAL USE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-480 949 11/6  
AEROJET-GENERAL CORP SACRAMENTO CALIF MATERIALS RESEARCH  
LAB

TERNARY PHASE EQUILIBRIA IN TRANSITION METAL-BORON-  
CARBON-SILICON SYSTEMS. PART I. RELATED BINARY  
SYSTEMS. VOLUME VIII. ZR-B SYSTEM. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
JAN 66 34P RUDY, E. I  
CONTRACT: AF 33(615)-1249  
PROJ: AF-7350  
TASK: 735001  
MONITOR: AFML TR-65-2-PT-1-VOL-8

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•ZIRCONIUM ALLOYS, PHASE STUDIES),  
(•BORON ALLOYS, PHASE STUDIES), (•PHASE STUDIES,  
REFRACTORY METAL ALLOYS), BORIDES, HIGH-  
TEMPERATURE RESEARCH, TRANSITION ELEMENTS, REVIEWS,  
DIFFERENTIAL THERMAL ANALYSIS, POWDER METALS, X-  
RAY DIFFRACTION ANALYSIS, CHEMICAL ANALYSIS, CARBON  
ALLOYS, METALLOGRAPHY, MELTING POINT, HEAT  
TREATMENT, QUENCHING(COOLING), MICROSTRUCTURE,  
MELTING, ELECTRIC ARCS, ELECTRON BEAMS, GRAIN  
STRUCTURES(METALLURGY), GRAIN BOUNDARIES,  
SILICON ALLOYS (U)  
IDENTIFIERS: ZIRCONIUM DIBORIDE (U)

THE BINARY ALLOY SYSTEM ZIRCONIUM-BORON HAS BEEN  
INVESTIGATED BY MEANS OF X-RAY, METALLOGRAPHIC,  
MELTING POINT, AND DIFFERENTIAL-THERMOANALYTICAL  
TECHNIQUES. THE EXPERIMENTAL ALLOY MATERIAL  
COMPRISED OF HOT-PRESSED AND HEAT-TREATED, ARC- AND  
ELECTRON-BEAM MELTED, AS WELL AS EQUILIBRATED AND  
QUENCHED ALLOY MATERIAL. ALL PHASES OF THE  
EXPERIMENTAL INVESTIGATIONS WERE SUPPORTED BY  
CHEMICAL ANALYSIS. THE RESULTS OF THE PRESENT  
INVESTIGATION, WHICH RESULTED IN THE ESTABLISHMENT OF  
A COMPLETE PHASE DIAGRAM FOR THE SYSTEM, ARE  
DISCUSSED AND COMPARED WITH PREVIOUSLY ESTABLISHED  
SYSTEM DATA. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-489 752 11/6  
AEROJET-GENERAL CORP SACRAMENTO CALIF MATERIALS RESEARCH  
LAB

TERNARY PHASE EQUILIBRIA IN TRANSITION METAL-BORON-  
CARBON-SILICON SYSTEMS. PART II. TERNARY SYSTEMS.  
VOLUME X. THE ZR-SI-C, HF-SI-C, ZR-SI-B, AND HF-SI-B  
SYSTEMS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
SEP 66 95P BRUKL, C. E. I  
CONTRACT: AF 33(615)-1249  
PROJ: AF-7350  
TASK: 735001  
MONITOR: AFML TR-65-2-PT-2-VOL-10

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*TRANSITION ELEMENTS, \*PHASE STUDIES),  
(\*ZIRCONIUM, \*HAFNIUM), (\*CARBON, \*BORON),  
(\*SILICON, PHASE STUDIES), POWDER METALS, HIGH-  
TEMPERATURE RESEARCH, MELTING POINT,  
QUENCHING(COOLING), FEASIBILITY STUDIES, HEAT  
TREATMENT, METALLOGRAPHY, X-RAY DIFFRACTION  
ANALYSIS, CHEMICAL ANALYSIS, ARC MELTING (U)

PHASE EQUILIBRIA AND MUTUAL SOLUBILITIES IN THE  
ZR-SI-C, HF-SI-C, AND HF-SI-B  
TERNARY SYSTEMS HAVE BEEN DETERMINED AT 1300 C.  
THE GENERAL MELTING BEHAVIOR AND HIGH TEMPERATURE  
MUTUAL SOLUBILITIES IN THE ZR-SI-C, HF-SI-  
C, ZR-SI-B, AND HF-SI-B SYSTEMS HAVE  
BEEN STUDIED; MINIMUM MELTING TEMPERATURES ALONG  
VARIOUS PSEUDO-BINARY SECTIONS ARE GIVEN. ALL FOUR  
SYSTEMS ARE CHARACTERIZED BY THE FORMATION OF A  
TERNARY DB(8)-NOWOTNY PHASE. MOST MELTING  
TEMPERATURES IN THE TERNARY SYSTEMS ARE GOVERNED BY  
THE LOWER MELTING BINARY SILICIDE COMPOUNDS.  
GUIDELINES FOR FEASIBLE HIGH TEMPERATURE  
APPLICATIONS ARE GIVEN. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-600 790

UNITED STATES STEEL CORP MONROEVILLE PA

THE EFFECT OF COBALT ON THE STRENGTH AND TOUGHNESS OF  
NI-CR-MO HIGH-YIELD-STRENGTH STEELS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,

APR 64 33P BIRKLE, A. J. PORTER, L. F. I

CONTRACT: NOBS88540

PROJ: SS050 000

TASK: 1567

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*STEEL, STRENGTH), (\*TOUGHNESS, STEEL),  
(\*COBALT, METALLURGY), QUENCHING (COOLING), HEAT  
TREATMENT, NICKEL, CHROMIUM, MOLYBDENUM, MECHANICAL  
PROPERTIES, METALLOGRAPHY, WELDING, FEASIBILITY STUDY (U)  
IDENTIFIERS: TEMPERING, HY-180/210 WELDMENT, MARAGING  
STEEL (U)

QUENCHED AND TEMPERED STEELS ALSO HOLD PROMISE AS  
BASE METALS FOR AN HY-180/210 WELDMENT.  
THEREFORE, A PROGRAM WAS INITIATED TO EVALUATE  
QUENCHED AND TEMPERED STEELS FOR THIS APPLICATION.  
THE EFFECT OF VARYING COBALT CONTENT FROM 0 TO 8  
PERCENT ON THE STRENGTH AND TOUGHNESS OF 5NI-  
1.5CR-0.5MO STEELS CONTAINING EITHER 0.18 OR 0.25  
PERCENT CARBON WAS DETERMINED. STUDIES ON 1/2-  
INCH-THICK WATER-QUENCHED PLATES SHOWED THAT ALL THE  
STEELS EXHIBITED OPTIMUM TOUGHNESS AT HIGH YIELD  
STRENGTHS WHEN TEMPERED AT 400 F. STEELS WITHOUT  
COBALT AND A STEEL CONTAINING 0.23 PERCENT CARBON AND  
8.04 PERCENT COBALT HAD THE BEST NOTCH TOUGHNESS AT  
YIELD STRENGTHS IN THE RANGE 170 TO 210 KSI. THE  
TOUGHNESS OF THESE STEELS APPROACHED THAT OBTAINED IN  
1/2-INCHTHICK PLATES FROM PRODUCTION HEATS OF 12NI-  
5CR3MO MARAGING STEEL. EXCEPT FOR THE STEELS  
CONTAINING 8 PERCENT COBALT, INCREASING COBALT  
CONTENT GENERALLY LOWERED TOUGHNESS WITHOUT MARKEDLY  
INCREASING STRENGTH. RAISING THE CARBON CONTENT OF  
THE BASE STEEL FROM 0.19 TO 0.26 PERCENT RESULTED IN  
AN INCREASE IN YIELD STRENGTH FROM 170 TO 189 KSI  
WHEN THE STEEL WAS TEMPERED AT 400 F. (AUTHOR) (U)



UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-600 793

UNITED STATES STEEL CORP MONROEVILLE PA

BASE-METAL EVALUATION OF A PRODUCTION ELECTRIC FURNACE  
HEAT OF SNI-CR-MO-V STEEL. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
APR 64 41P MANGANELLO, S. J. PORTER, L.  
F. I  
CONTRACT: NOBS88540  
PROJ: SRO07 01 01  
TASK: 853

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*STEEL, HEAT TREATMENT), (\*SUBMARINE  
HULLS, STEEL), (\*METAL PLATES, MECHANICAL PROPERTIES),  
ROLLING (METALLURGY), QUENCHING (COOLING), AUSTENITE,  
PRODUCTION, TESTS, TOUGHNESS, STRENGTH, NICKEL,  
CHROMIUM, MOLYBDENUM, VANADIUM (U)  
IDENTIFIERS: HY-130/150 STEEL, TEMPERING (U)

AN 80-TON ELECTRIC-FURNACE HEAT OF THE SNI-  
CR-MO-V STEEL WAS MELTED, ROLLED TO 1/2-, 1-, 2-  
, AND 4-INCH-THICK PLATES, AND THE PLATES WERE  
QUENCHED AND TEMPERED. AN INITIAL EVALUATION OF  
THE PRODUCTION AND PROPERTIES OF THE PLATES INDICATED  
THAT THE SNI-CR-MO-V STEEL WAS SATISFACTORY  
IN ALL RESPECTS. THEREFORE, THE PRODUCTION PLATES  
WERE MORE COMPLETELY EVALUATED TO DETERMINE THE  
EFFECT OF VARIOUS AUSTENITIZING AND TEMPERING  
TREATMENTS ON THEIR MECHANICAL PROPERTIES AND TO  
DETERMINE THE UNIFORMITY OF THEIR MECHANICAL  
PROPERTIES. THE HEAT-TREATING STUDIES SHOWED THAT  
THE TEMPERING CHARACTERISTICS OF THE PRODUCTION  
PLATES WERE SIMILAR TO THOSE OF THE LABORATORY  
SNI-CR-MO-V STEEL, THAT BLOWER-COOLING 1/2-  
INCH-THICK PLATES TO SIMULATE THE COOLING AT THE  
MIDTHICKNESS OF A 4-INCH-THICK WATER-QUENCHED PLATE  
WAS A CONSERVATIVE SIMULATION AS PREVIOUSLY REPORTED,  
THAT THE SNI-CR-MO-V STEEL HAS ADEQUATE  
HARDENABILITY FOR 4-INCH-THICK PLATES, AND THAT THE  
TENSILE AND IMPACT PROPERTIES OF HEAVY-GAGE SNI-  
CR-MO-V STEEL PLATES ARE SLIGHTLY IMPROVED BY A  
DOUBLE- VERSUS A SINGLE-AUSTENITIZING TREATMENT.  
THE STUDIES OF THE UNIFORMITY OF THE PRODUCTION  
PLATES SHOWED THAT THE LONGITUDINAL AND TRANSVERSE  
TENSILE AND IMPACT PROPERTIES OF THE 1/2- THROUGH 4-  
INCH-THICK PRODUCTION PLATES OF THE SNI-CR-MO-  
V STEEL WERE GENERALLY UNIFORM. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-601 825

TITANIUM METALS CORP OF AMERICA NEW YORK

DEVELOPMENT OF A STABLE-BETA TITANIUM ALLOY. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 6, 1 OCT-31 DEC 63

DEC 63 36P HUNTER, D. B. ;  
CONTRACT: DA30 0690RD3743  
PROJ: DA-59332008  
MONITOR: WAL CR-405.2/5

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*TITANIUM ALLOYS, DISPERSION HARDENING),  
(\*DISPERSION HARDENING, TITANIUM ALLOYS), AGING  
(MATERIALS), VANADIUM ALLOYS, CHROMIUM ALLOYS, ALUMINUM  
ALLOYS, MOLYBDENUM ALLOYS, IRON ALLOYS, COPPER ALLOYS,  
NICKEL ALLOYS, ROLLING (METALLURGY), EUTECTICS,  
QUENCHING (COOLING), TENSILE PROPERTIES, DUCTILITY, COLD  
WORKING, HOT WORKING, PHASE STUDIES, MICROSTRUCTURE (U)  
IDENTIFIERS: TITANIUM ALLOY 3AL 4FE 17V, TITANIUM  
ALLOY 3AL 2FE 8MO 8V, TITANIUM ALLOY 3AL 10MN 17V,  
TITANIUM ALLOY 3AL 6FE 8MO 8V (U)

AN ATTEMPT TO INDUCE COMPOUND PRECIPITATION  
HARDENING IN TI-17V-10CR-3AL, TI-8MO-  
8V-7.5FE-3AL, TI-8MO-8V7.5FE-3AL-  
1CO AND TI-15MO-5FE-3AL ALLOYS BY COLD  
REDUCTION AND SUBSEQUENT AGING RESULTED IN HARDENING  
BY ALPHA PRECIPITATION INSTEAD. SIMILAR WORK ON  
TI-17V-8CR-3AL-3NI INDICATED THAT THIS  
ALPHA HARDENING WAS INDUCED BY EITHER HOT OR COLD  
ROLLING AND SUPPRESSED BY SOLUTION TREATMENT.  
SOLUTION TREATING, QUENCHING AND AGING TI-17V-  
10CR-3AL, CONTAINING 0.5 AND 1% SI, AT  
1250F RESULTED IN RAPID HARDNESS INCREASES OF UP TO  
100 VICKERS POINTS WITHOUT ANY CLEAR ACCOMPANYING  
MICROSTRUCTURAL CHANGE; SLOW COOLING SUPPRESSED THIS  
AGING RESPONSE. AGING RESPONSES WERE DETERMINED  
FOR THE METASTABLE ALLOYS TI-17V(1.5 TO 4)FE-  
3AL AND TI-8MO-8V-(1 TO 3) FE-3AL, OVER  
A RANGE OF TIMES AND TEMPERATURES. A STATISTICAL  
CORRELATION BETWEEN VICKERS HARDNESS AND ULTIMATE  
TENSILE STRENGTH ON STABLE-BETA ALLOYS INDICATED THAT  
25 VICKERS POINTS CORRESPONDED TO ABOUT 10,000 PSI.  
TWO METASTABLE AND TWO STABLE-BETA ALLOYS WERE  
SELECTED FOR FURTHER EVALUATION AS LARGER INGOTS:  
METASTABLE TI-17V-4FE-3AL AND TI-8MO-  
8V2FE-3AL.

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMCI

AD-602 075

DAVID TAYLOR MODEL BASIN WASHINGTON D C

FACTORS INFLUENCING THE FATIGUE LIFE OF AN HY-80  
COMPOSITION STEEL FULLY QUENCHED AND TEMPERED TO  
VARIOUS STRENGTH LEVELS.

(U)

DESCRIPTIVE NOTE: PROGRESS REPT.,

JUN 64 31P WILLNER, A. R. ISALIVE, M. L.

;

REPT. NO. DTMB-1807

PROJ: S FO13 03 02

TASK: 2018

UNCLASSIFIED REPORT

DESCRIPTORS: (STEEL, FATIGUE (MECHANICS)), TENSILE  
PROPERTIES, LIFE EXPECTANCY, AUSTENITE, GRAIN STRUCTURES  
(METALLURGY), QUENCHING (COOLING), HEAT TREATMENT (U)

THE REPORT EVALUATES THE EFFECTS OF STRENGTH LEVEL,  
CHARPY V-NOTCH ENERGY, PRESTRAINING, PRESTRAINING  
AND STRESS RELIEVING, AND AUSTENITIZING TEMPERATURE  
ON THE FATIGUE LIFE OF A FULLY QUENCHED HY-80 STEEL  
COMPOSITION. THE FATIGUE DATA DEVELOPED INDICATE  
THAT THE DESIGNER WOULD HAVE TO BE CAUTIOUS WHEN  
GOING TO HIGHER STRENGTH STEEL WHEN USING A SAFETY  
FACTOR WHICH IS CONSIDERED SATISFACTORY FOR LOWER  
STRENGTH STEELS, I.E., IF HIGHER STRENGTH STEELS ARE  
TO BE USED, LARGER SAFETY FACTORS ARE NECESSARY TO  
OBTAIN A COMPARABLE FATIGUE LIFE. THE LIMITED DATA  
PRESENTED ON EXPERIMENTAL HY-150 STEELS INDICATE  
THAT CAUTION WILL HAVE TO BE EXERCISED IN EVALUATING  
LARGE-SPECIMEN FATIGUE DATA. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-602 103

ISTITUTO SPERIMENTALE DEI METALLI LEGGERI MILAN  
(ITALY)

RESISTOMETRIC INVESTIGATION OF PRE-PRECIPITATION IN  
THE Al-MG 5% ALLOY. (U)

DESCRIPTIVE NOTE: FINAL REPT. FOR 1 JAN-31 DEC 63.,  
JAN 64 43P FEDERIGHI, T. ICERESARA, S. I  
REPT. NO. 13 177 6401 104  
CONTRACT: DA91 591EUC2767

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (MAGNESIUM ALLOYS, AGING (MATERIALS),  
(ALUMINUM ALLOYS, AGING (MATERIALS), QUENCHING  
(COOLING), HEAT TREATMENT, CRYSTAL LATTICE DEFECTS,  
RESISTANCE (ELECTRICAL), NITROGEN, LIQUEFIED GASES,  
ITALY, DIFFUSION, CHEMICAL PRECIPITATION (U)  
IDENTIFIERS: SUPERSATURATION (U)

THE PRE-PRECIPITATION PROCESS IN THE SUPERSATURATED  
AL-5.1% AT.% MG ALLOY HAS BEEN EXTENSIVELY  
INVESTIGATED BY MEANS OF ELECTRICAL RESISTIVITY  
MEASUREMENTS PERFORMED AT LIQUID NITROGEN TEMPERATURE  
(-195C). AS KNOWN, WHERE AS THE PROCESS CANNOT  
BE DISCOVERED IN AL-MG ALLOYS BY THE USUAL X-  
RAY LOW ANGLE METHOD IT IS POSSIBLE TO DETECT IT BY  
RESISTIVITY MEASUREMENTS, SINCE DURING THE BEGINNING  
OF THE PROCESS RESISTIVITY UNDERGOES AN INCREASE  
WHICH CAN BE EASILY SEPARATED FROM OTHER RECOVERY  
PROCESSES. (U)

UNCLASSIFIED

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-602 801

STANFORD UNIV CALIF STANFORD ELECTRONICS LABS

DEFECT STRUCTURES IN QUENCHED AND ANNEALED GAAS  
CRYSTALS,

(U)

JUN 64 18P PEARSON, G. L. POTTS, H. R. ;  
MACRES, V. G. ;  
REPT. NO. 64 D69 , TR5106 1  
CONTRACT: DA31 124AR0 D155  
PROJ: 20010501B700

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*CRYSTAL LATTICE DEFECTS, MEASUREMENT),  
(\*GALLIUM ALLOYS, ARSENIC ALLOYS), SINGLE CRYSTALS, HEAT  
TREATMENT, QUENCHING (COOLING), DIFFRACTION ANALYSIS,  
CRYSTAL LATTICES, ENTHALPY  
IDENTIFIERS: GALLIUM ARSENIDE

(U)

(U)

LATTICE PARAMETER MEASUREMENTS HAVE BEEN MADE BY  
THE KOSSEL-LINE TECHNIQUE ON QUENCHED GALLIUM  
ARSENIDE CRYSTALS. SAMPLES QUENCHED FROM  
TEMPERATURES ABOVE 1000C SHOWED AN INCREASE IN  
LATTICE PARAMETER. THE CHANGE WITH TEMPERATURE HAS  
AN ENTHALPY OF 2.0 EV AND IS ATTRIBUTED TO THE  
FORMATION OF VACANCIES. ROOM-TEMPERATURE  
ANNEALING OF THE DEFECTS IS ALSO SHOWN, AND IS SEEN  
TO PROCEED IN SEVERAL STAGES. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-602 829

ILLINOIS UNIV URBANA

EQUILIBRIUM SOLUTIONS OF NITROGEN IN COLUMBIUM-BASE ALLOYS. (U)

DESCRIPTIVE NOTE: REPT. FOR 15 MAR 63-15 MAR 64,  
JUN 64 28P DELAMOTTE, E. I HUANG, Y. C. I  
ALTSTETTER, C. J. I  
CONTRACT: AF33 657 10626  
PROJ: AF-7351  
TASK: 735106  
MONITOR: AFML TDR64 134

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*NIOBIUM ALLOYS, IMPURITIES), (\*NITROGEN,  
SOLID SOLUTIONS), ZIRCONIUM ALLOYS, NIOBIUM COMPOUNDS,  
NITRIDES, THERMODYNAMICS, HEAT OF FORMATION, HEAT OF  
SOLUTION, PHASE STUDIES, MECHANICAL PROPERTIES, INTERNAL  
FRICTION, HARDNESS, QUENCHING (COOLING), GRAIN  
STRUCTURES (METALLURGY) (U)  
IDENTIFIERS: NIOBIUM NITRIDES (U)

THERMODYNAMIC AND MECHANICAL PROPERTIES OF  
COLUMBIUM-NITROGEN AND COLUMBIUM-ZIRCONIUM-NITROGEN  
ALLOYS WERE DETERMINED. THE PARTIAL PRESSURE OF  
NITROGEN IN EQUILIBRIUM WITH SINGLE-PHASE AND TWO-  
PHASE ALLOYS OF VARIOUS BINARY AND TERNARY  
COMPOSITIONS WAS DETERMINED AS A FUNCTION OF  
TEMPERATURE FOR TEMPERATURES BETWEEN 1500C AND  
2100C. HEAT OF SOLUTION OF NITROGEN, HEAT OF  
FORMATION OF CB2N, AND HEAT OF SOLUTION OF  
CB2N VALUES WERE DETERMINED FOR PURE COLUMBIUM  
AND COLUMBIUM WITH 0.86 WT % ZR. INTERNAL  
FRICTION AND HARDNESS WERE MEASURED FOR SEVERAL  
ALLOYS WHICH HAD BEEN QUENCHED FROM ABOVE 1500C.  
FOR THE RADIATION QUENCH USED, SOLID SOLUTIONS WITH  
0.075 WT % NITROGEN AND OVER COULD NOT BE RETAINED  
WITHOUT PRECIPITATION. FOR THE COARSE-GRAINED  
SPECIMENS HARDNESS INCREASED FROM 107 KHN FOR THE  
PURE COLUMBIUM TO 178 KHN FOR A TWO-PHASE ALLOY  
CONTAINING 0.68 WT % NITROGEN. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-603 551

FRANKFORD ARSENAL PHILADELPHIA PA

STRESS CORROSION TESTS OF SOME WROUGHT MG-LI BASE  
ALLOYS, (U)

JUL 64 22P KISZKA, J. C. I  
REPT. NO. FA-M65-1-1  
PROJ: DA-59332007

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*MAGNESIUM ALLOYS, CORROSION), (\*LITHIUM  
ALLOYS, CORROSION), (\*CORROSION, STRESSES), (\*WELDS,  
MAGNESIUM ALLOYS), ALUMINUM ALLOYS, ZINC ALLOYS, SILVER  
ALLOYS, SILICON ALLOYS, HUMIDITY, AIR, ENVIRONMENTAL  
TESTS, ARMOR PLATE, CREEP, QUENCHING (COOLING), TENSILE  
PROPERTIES, HARDNESS (U)  
IDENTIFIERS: MAGNESIUM ALLOY 14LI, STRESS  
CORROSION (U)

SEVEN EXPERIMENTAL WROUGHT MG-LI BASE ALLOYS  
(MG-14LI WITH VARIOUS ADDITIONS OF AL, ZN,  
AG, AND/OR SI) WERE TESTED FOR STRESS CORROSION  
SUSCEPTIBILITY IN HUMID AIR, FOLLOWING MECHANICAL AND  
THERMAL PROCESSING TO APPROXIMATE CONDITIONS IN THE  
HEAT-AFFECTED ZONE OF A WELD. STRESS LEVELS DURING  
EXPOSURE WERE UNCERTAIN BECAUSE OF CREEP EFFECTS.  
RAPID COOLING FROM 700F RENDERED SUSCEPTIBLE  
THOSE ALLOYS CONTAINING ALUMINUM, REGARDLESS OF OTHER  
ALLOY CONTENT. HOWEVER, HEATING FOR 24 HOURS AT  
300F FOLLOWING SUCH RAPID COOLING RESTORED THEIR  
RESISTANCE TO STRESS CORROSION. ALLOYS  
STRENGTHENED BY ADDITIONS OF ZINC, SILICON, AND/OR  
SILVER, BUT WITH ALUMINUM EXCLUDED, DID NOT FAIL IN  
STRESS CORROSION UNDER THE CONDITIONS OF TEST USED IN  
THIS STUDY. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-608 281

TITANIUM METALS CORP OF AMERICA NEW YORK

DEVELOPMENT OF A STABLE-BETA TITANIUM ALLOY. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 7, 1 JAN-31 MAR 64,

MAR 64 42P HUNTER, D. B. ;

CONTRACT: DA30 0690RD3743

PROJ: 59332008

MONITOR: WAL , TR405 2 6

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: LEGIBILITY OF THIS DOCUMENT IS IN PART UNSATISFACTORY. REPRODUCTION HAS BEEN MADE FROM BEST AVAILABLE COPY.

DESCRIPTORS: (\*TITANIUM ALLOYS, DISPERSION HARDENING), (\*DISPERSION HARDENING, TITANIUM ALLOYS), VANADIUM ALLOYS, CHROMIUM ALLOYS, ALUMINUM ALLOYS, SILICON ALLOYS, NICKEL ALLOYS, IRON ALLOYS, MANGANESE ALLOYS, COBALT ALLOYS, MOLYBDENUM ALLOYS, HEAT TREATMENT, AGING (MATERIALS), EUTECTICS, HARDNESS, MICROSTRUCTURE, ROLLING (METALLURGY), DUCTILITY, TENSILE PROPERTIES, HOT WORKING, QUENCHING (COOLING) (U)

SAMPLES OF TI-17V-10CR-3AL-1SI, QUENCHED

FROM 2050F AND AGED AT TEMPERATURES OF 950-1150F, SHOWED VICKERS' HARDNESS INCREASES RANGING UP TO 100 POINTS AFTER AGING FOR 1 HOUR OR MORE AT 1150F. LESSER HARDNESS INCREASES WERE PRODUCED BY AGING AT EITHER 950 OR 1050F. TI-17V10CR-3AL-

0:5SI SHOWED A SIMILAR, ALTHOUGH SMALLER AGING RESPONSE. SUCH HARDNESS INCREASES WERE NOT ACCOMPANIED BY ANY CLEAR MICROSTRUCTURAL CHANGE. SUBSTITUTION OF 0.2% BE FOR SI RESULTED IN NO AGING RESPONSE. HYPEREUTECTOID ALLOYS TI-(8-10)NI-5FE, TI-(8-10)NI-5MN, TI-(11-13)CO5FE, AND TI-(11-13)CO-5MN WERE

QUENCHED FROM 1750 AND 1850F AND AGED AT 900F. A MARKED AGING RESPONSE WAS ONLY FOUND IN THOSE ALLOYS CONTAINING NI. METALLOGRAPHIC EXAMINATION SHOWED THAT MELTING OCCURRED IN THESE ALLOYS DURING SOLUTION TREATMENT. HOT ROLLING PRESSURE DETERMINATIONS ON STABLE-BETA ALLOYS TI-17V-10MN-3AL AND TI-8MO-8V-6FE-3AL SHOWED THAT THESE ALLOYS WERE NO MORE DIFFICULT TO HOT ROLL THAN THE COMMERCIAL BETA ALLOY TI-13V-11CR-3AL. COMPLETE SUBSTITUTION OF CO FOR FE IN A STABLE-BETA ALLOY TI-8MO-8V-5FE-3AL DID NOT IMPROVE UNIFORM ELONGATION. (AUTHOR)

(U)

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/ZOHCI



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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-608 445

MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF  
ELECTRONICS

DEVELOPMENT OF A LARGE-VOLUME SUPERCONDUCTING  
SOLENOID.

(U)

DESCRIPTIVE NOTE: DOCTORAL THESIS,

OCT 64 131P

DONADIEU, LUCIEN J. I

REPT. NO. RLE-427

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*SUPERCONDUCTORS, SOLENOIDS), (\*SOLENOIDS,  
SUPERCONDUCTORS), COILS, SUPERCONDUCTIVITY, NIOBIUM  
ALLOYS, MOLYBDENUM ALLOYS, RHENIUM ALLOYS, ZIRCONIUM  
ALLOYS, MAGNETIC PROPERTIES, ELECTRICAL PROPERTIES,  
CRYOGENICS, QUENCHING (COOLING), HEAT TRANSFER, THERMAL  
RADIATION, FEASIBILITY STUDIES, EXPERIMENTAL DATA (U)

PROBLEMS ENCOUNTERED IN THE DEVELOPMENT OF  
LARGE VOLUME SUPERCONDUCTING SOLENOIDS HAVE BEEN  
INVESTIGATED IN THE LIGHT OF THE EXPERIENCE INDUCED  
BY THE REALIZATION OF A PARTICULAR PROTOTYPE (8.0  
INCHES IN DIAMETER, 4 FT LONG, 20 KILOGAUSS AT ROOM  
TEMPERATURE). THE CURRENT-FIELD CHARACTERISTICS OF  
SOME USEFUL SUPERCONDUCTING MATERIALS (NB, MO-  
RE, NB-ZR) HAVE BEEN MEASURED; THE RESULTS  
ARE DISCUSSED IN TERMS OF RECENT THEORIES OF  
SUPERCONDUCTORS. THE SPURIOUS LOSS OF THE  
RESISTANCELESS STATE OF A SUPERCONDUCTING SOLENOID,  
WHICH IS PARTICULARLY DANGEROUS FOR LARGE-VOLUME  
DEVICES, BECAUSE OF THE LARGE MAGNETIC ENERGY  
INVOLVED, WAS THOROUGHLY INVESTIGATED. STARTING  
FROM THE STEADY-STATE MECHANISMS OF THE QUENCHING  
PROPAGATION IN WIRE, THE EQUATIONS FOR CURRENT DECAY,  
VOLTAGE SURGE, WIRE-TEMPERATURE RISE, AND ENERGY  
TRANSFER ARE DERIVED; RESULTS OF CALCULATIONS FOR THE  
PROTOTYPE SOLENOID ARE PRESENTED. THE DESIGN OF  
THE PROTOTYPE SOLENOID, WHICH CAN BE DIVIDED SOMEWHAT  
ARBITRARILY INTO THE MAGNETIC-FIELD GENERATING SYSTEM  
AND THE CRYOGENIC SYSTEM, IS THOROUGHLY DETAILED.  
THE MOST IMPORTANT TOPICS COVERED ARE: FIELD  
CALCULATION FOR MULTICOIL SOLENOIDS (A MACHINE  
PROGRAM TO CALCULATE THE FIELD ON- AND OFF-AXIS IS  
PRESENTED); MAGNETIC STRESSES AND MAGNETIC ENERGY;  
QUENCHING PROCESS FOR MULTICOIL SOLENOIDS; STEADY-  
STATE HEAT TRANSFER CAUSED BY RESIDUAL GAS, THERMAL  
RADIATION AND CONDUCTION (A DERIVATION OF THE  
CONDUCTION LOSS WITH COUNTERFLOW GAS COOLING. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-611 092  
CASE INST OF TECH CLEVELAND OHIO

INTERFACE MOTION IN PHASE TRANSFORMATIONS. BAINITE  
TRANSFORMATIONS IN HYPOEUTECTOID STEELS. (U)

FEB 65 34P GOODENOW, R. H. ; BARKALOW, R. H. ;  
HEHEMANN, R. F. I  
REPT. NO. TR-2  
CONTRACT: NONR114115

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*STEEL, GRAIN STRUCTURES (METALLURGY)),  
(\*BAINITE, TRANSFORMATIONS), PHASE STUDIES, CRYSTAL  
GROWTH, HEAT TREATMENT, QUENCHING (COOLING), NUCLEATION,  
THERMODYNAMICS, METALLOGRAPHY (U)  
IDENTIFIERS: HYPOEUTECTOID STEEL (U)

KINETIC AND STRUCTURAL ASPECTS OF BAINITE FORMATION  
WERE STUDIED BY STEPPED TRANSFORMATION EXPERIMENTS.  
GROWTH OF LOWER BAINITE STOPS IF THE TEMPERATURE IS  
RAISED TO THE UPPER RANGE AND UPPER BAINITE EITHER  
STOPS GROWING OR GROWS AT A RATE SUBSTANTIALLY BELOW  
THAT OF LOWER BAINITE WHEN THE TEMPERATURE IS REDUCED  
SUDDENLY TO THE LOWER RANGE. IT IS CONCLUDED THAT  
THE INTERNAL STRUCTURAL DIFFERENCES WHICH  
CHARACTERIZE UPPER AND LOWER BAINITE EXERT A  
SIGNIFICANT INFLUENCE ON THE RATE AT WHICH THESE  
PRODUCTS DEVELOP. IN THE STEELS STUDIED IN THIS  
INVESTIGATION, LOWER BAINITE PLATES THICKEN FROM ONE  
SIDE ONLY. THESE PLATES EXHIBIT A SUBSTRUCTURAL  
UNIT ORIENTED AT AN ANGLE TO THE GROWTH DIRECTION AND  
THESE UNITS APPEAR TO NUCLEATE AT THE IMMOBILE SIDE  
OF THE PLATES. EDGEWISE GROWTH RATES MEASURED ON  
THE HOT STAGE THUS MAY REFLECT PRIMARILY THE RATE OF  
NUCLEATION OF THESE SUBSTRUCTURAL UNITS. A SIMILAR  
SITUATION MAY PREVAIL IN THE GROWTH OF UPPER BAINITE  
NEEDLES. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-612 477

TITANIUM METALS CORP OF AMERICA NEW YORK

DEVELOPMENT OF A STABLE-BETA TITANIUM ALLOY. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 8, 1 APR-30 JUN 64,

JUN 64 35P HUNTER, D. B. I

CONTRACT: DA30 0690RD3743

PROJ: DA-59332008

MONITOR: WAL CR-405.2/7

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-608 281

DESCRIPTORS: (\*TITANIUM ALLOYS, DISPERSION HARDENING), (\*DISPERSION HARDENING, TITANIUM ALLOYS), VANADIUM ALLOYS, CHROMIUM ALLOYS, ALUMINUM ALLOYS, SILICON ALLOYS, MANGANESE ALLOYS, MOLYBDENUM ALLOYS, IRON ALLOYS, COBALT ALLOYS, AGING (MATERIALS), HEAT TREATMENT, MICROSTRUCTURE, BRITTLINESS, HARDNESS, ROLLING (METALLURGY), TENSILE PROPERTIES, CREEP, DUCTILITY, QUENCHING (COOLING) (U)  
IDENTIFIERS: TITANIUM ALLOY 3AL 10CR 1SI 17V, TITANIUM ALLOY 3AL 10MN 17V, TITANIUM ALLOY 3AL 6FE 8MO 8V, TITANIUM ALLOY 3AL 4FE 17V, TITANIUM ALLOY 3AL 2FE 8MO 8V (U)

THE UPPER TEMPERATURE LIMIT FOR OBTAINING A HARDNESS RESPONSE FROM TI-17V-10CR-3AL-1SI, QUENCHED FROM THE BETA FIELD, WAS 1300-1350F. BRITTLINESS IN SUCH ALLOYS IS PARTLY ASCRIBED TO THE LARGE GRAIN SIZE, PRODUCED BY THE HIGH TEMPERATURES NECESSARY FOR SILICIDE SOLUTION. COLD ROLLING PRESSURE DETERMINATIONS WERE MADE ON STABLE-BETA ALLOYS TI-8MO-8V-6FE-3AL AND TI-17V-10MN3AL. TENSILE TESTS ON MINOR COMPOSITIONAL VARIATIONS OF TI-17V-4FE-3AL AND TI-8MO-8V-2FE-3AL INDICATED THAT AT A HIGH PROPORTION OF ALPHA STABILIZING ELEMENTS RESULTED IN A FASTER AGING RESPONSE. STATISTICAL DETERMINATION OF THE VICKERS HARDNESS/UTS RELATIONSHIP SHOWED THAT IN BOTH ALLOYS 17 VICKERS POINTS EQUATED 10,000 PSI. COMPLETE SUBSTITUTION OF CO FOR FE IN TWO STABLE-BETA ALLOYS RESULTED IN SUCH ALLOYS BECOMING AGEABLE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-614 839

BRIGHAM YOUNG UNIV PROVO UTAH DEPT OF PHYSICS

DIFFUSION IN METALS AT ULTRA-HIGH PRESSURES. (U)

DESCRIPTIVE NOTE: FINAL REPT.,

MAR 65 56P DECKER, D. L. IVANFLEET, H. B.

CONTRACT: AF AFOSR201 63

MONITOR: AFOSR , 65-0580

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (METALS, DIFFUSION), (DIFFUSION, METALS),  
HIGH-PRESSURE RESEARCH, SILVER, WIRE, HEAT TREATMENT,  
QUENCHING (COOLING), GOLD, LEAD, RESISTANCE  
(ELECTRICAL), HEAT OF ACTIVATION, CRYSTAL LATTICE  
DEFECTS, HEAT OF FORMATION (U)

SILVER WIRES 3 MIL IN DIAMETER HAVE BEEN QUENCHED FROM TEMPERATURES BETWEEN 500 AND 1000 C TO ROOM TEMPERATURES FOR PRESSURES UP TO 30 KBAR. UPON QUENCHING, AN INCREASE IN ROOM TEMPERATURE RESISTANCE WAS MEASURED, BUT 90% OF THIS INCREASE WAS PERMANENT AND REMAINED EVEN AFTER HIGH TEMPERATURE ANNEALS. THE INCREASE IN RESISTANCE COULD THEREFORE NOT BE CORRELATED DIRECTLY WITH VACANCY FORMATION. BECAUSE OF THE UNCERTAINTY IN EXPLAINING THE RESULTS IT WAS NOT POSSIBLE TO OBTAIN MEANINGFUL ACTIVATION ENERGIES OR VOLUMES FROM THE MEASUREMENTS. THE DIFFUSION OF SILVER INTO LEAD HAS BEEN INVESTIGATED USING RADIOACTIVE TRACER TECHNIQUES IN A TEMPERATURE RANGE WITHIN 200 C OF THE MELTING POINT OF LEAD FOR SIX PRESSURES BETWEEN ZERO AND 40 KBAR. THE ACTIVATION ENERGY WAS FOUND TO INCREASE FROM 15.2 TO 21.9 = .3 KCAL/MOLE AS THE PRESSURE INCREASED FROM ATMOSPHERIC TO 39.2 KBAR. THE ACTIVATION VOLUME FOR PRESSURES BELOW 11.9 KBAR RANGED FROM .54 = .06 TO .48 = .05 ATOMIC VOLUMES AS THE TEMPERATURE DECREASED FROM 769 TO 556 K. ABOVE 11.9 KBAR THE ACTIVATION VOLUME WAS NEARLY CONSTANT AT .38 = .03 ATOMIC VOLUMES OVER THE SAME TEMPERATURE INTERVAL. AS A RESULT OF THE LARGE DECREASE IN THE ACTIVATION VOLUME THAT OCCURS BETWEEN ZERO AND 11.9 KBAR IT IS SUGGESTED THAT THE DIFFUSION PROCESS FOR SILVER INTO LEAD CHANGES FROM A COMPOSITE OF INTERSTITIAL PLUS VACANCY TO AN INTERSTITIAL MECHANISM. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-615 974

NORTH AMERICAN AVIATION SCIENCE CENTER THOUSAND OAKS  
CALIF

A FUNDAMENTAL STUDY OF DEFECT-DISLOCATION INTERACTION  
IN NaCl TYPE LATTICES. (U)

DESCRIPTIVE NOTE: FINAL REPT. FOR 1 MAR 63-28 FEB 65,  
FEB 65 68P CHANG, R. I  
CONTRACT: NONR406300  
PROJ: NR032 479

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*CRYSTAL LATTICE DEFECTS, HALIDES),  
(\*HALIDES, CRYSTAL LATTICE DEFECTS), SODIUM  
COMPOUNDS, CHLORIDES, FLUORIDES, DEFORMATION,  
STRESSES, CRYSTAL LATTICES, DIPOLE MOMENTS,  
STRAIN(MECHANICS), CREEP, QUENCHING(COOLING),  
HEAT TREATMENT, POTASSIUM COMPOUNDS, CALCIUM,  
IMPURITIES, LITHIUM COMPOUNDS (U)  
IDENTIFIERS: LITHIUM CHLORIDE, SODIUM CHLORIDE,  
POTASSIUM CHLORIDE (U)

CONTENTS: EFFECT OF DIVALENT METAL IMPURITY  
DISTRIBUTION, QUENCHING RATE, AND ANNEALING  
TEMPERATURE ON FLOW STRESS IN IONIC CRYSTALS  
(NaCl, LiF) THE ELASTIC INTERACTION BETWEEN  
DISLOCATIONS AND DEFECTS ASSOCIATED WITH CALCIUM  
IMPURITIES IN SODIUM CHLORIDE PERTURBATION OF THE  
V2-BAND IN CA-DOPED KCl FROM ELASTIC AND  
PLASTIC DEFORMATION OPTICAL PROPERTIES OF THE  
ENVIRONMENT OF F CENTERS IN DE FORMED ALKALI  
HALIDES. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMCI

AD-617 399

BOEING SCIENTIFIC RESEARCH LABS SEATTLE WASH

PHASE TRANSFORMATIONS IN THE ALLOY, TI : 8%Al : 1%Mo : 1%V. (U)

JAN 65 84P BLACKBURN, MARTIN J. :  
REPT. NO. D1-82-0402  
MONITOR: IDEP 502.30.80.00-C6-06

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPT. ON SOLID STATE PHYSICS.  
ALSO AVAILABLE FROM THE AUTHOR.

DESCRIPTORS: (TITANIUM ALLOYS, PHASE STUDIES),  
(PHASE STUDIES, TITANIUM ALLOYS), ALUMINUM ALLOYS,  
MOLYBDENUM ALLOYS, VANADIUM ALLOYS.  
MICROSTRUCTURE, HEAT TREATMENT, TRANSITION  
TEMPERATURE, ELECTRON DIFFRACTION ANALYSIS, CRYSTAL  
LATTICES, TRANSFORMATIONS, MARTENSITE,  
QUENCHING(COOLING), AGING(MATERIALS), CRYSTAL  
LATTICE DEFECTS, MECHANICAL PROPERTIES, DEFORMATION (U)  
IDENTIFIERS: TITANIUM ALLOY 8AL1MO1V (U)

THE MICRO-STRUCTURES OF THE ALLOY TI : 8%Al : 1%Mo : 1%V AFTER VARIOUS HEAT TREATMENTS HAVE BEEN STUDIED BY TRANSMISSION ELECTRON MICROSCOPY. AN ORDERING REACTION OCCURS IN THE ALPHA PHASE, THE CRITICAL TEMPERATURE FOR THE REACTION BEING APPROXIMATELY 525 C, ELECTRON DIFFRACTION RESULTS ARE CONSISTENT WITH THE FORMATION OF A DO SUB 19 TYPE SUPERLATTICE. THE BETA-PHASE TRANSFORMS MARTENSITICALLY WHEN QUENCHED FROM TEMPERATURES ABOVE APPROXIMATELY 875 C. TWO FORMS OF MARTENSITE HAVE BEEN FOUND, A HEAVILY FAULTED HEXAGONAL OR FACE CENTERED CUBIC STRUCTURE ALPHA' FORMED AT LOW TEMPERATURES AND A HEXAGONAL STRUCTURE ALPHA DOUBLE' FORMED AT HIGHER TEMPERATURES. AGING OF A SUPERSATURATED BETA-PHASE OR THE MARTENSITIC STRUCTURES ALPHA' OR ALPHA DOUBLE' RESULT IN THE FORMATION OF MIXTURES OF THE ALPHA AND BETA-PHASES, HOWEVER, THE REACTION MECHANISMS ARE SHOWN TO BE DEPENDENT ON THE INITIAL STRUCTURES. THE RESULTS ARE RELATED TO SOME OF THE MECHANICAL PROPERTIES OF THE ALLOY AND AN ATTEMPT IS MADE TO ACCOUNT FOR THE DIFFERENCES IN PROPERTIES OF DUPLEX AND MILL ANNEALED MATERIAL. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-617 785

BATTELLE MEMORIAL INST COLUMBUS OHIO

STRUCTURAL CHANGES IN HIGH-STRENGTH STEEL ASSOCIATED  
WITH STRESS CORROSION AND ITS RELATIONSHIP TO DELAYED  
FAILURE. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 1, 29  
JUN-28 SEP 64,

SEP 64 IIP VAUGHAN, D. A. ; PHALEN, D. I. ;  
TRIPLER, A. B. ; SCHWARTZ, C. M. ;

CONTRACT: NOW-64-0267

PROJ: WRO07 05 01

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*STEEL, CORROSION), (\*CORROSION,  
STEEL), (\*STRESSES, CORROSION), MICROSTRUCTURE,  
ELECTRON DIFFRACTION ANALYSIS, X-RAY DIFFRACTION  
ANALYSIS, FRACTURE(MECHANICS), HEAT TREATMENT,  
QUENCHING(COOLING), METALLOGRAPHY (U)  
IDENTIFIERS: STRESS CORROSION, STEEL 4340 (U)

THE INVESTIGATION OF STRUCTURAL CHARACTERISTICS OF  
AISI 4340 STEEL QUENCHED AND TEMPERED TO PRODUCE  
THREE STRENGTH LEVELS HAS BEEN INITIATED AS A BASIS  
FOR THE PLANNED STUDIES OF THESE MATERIALS UNDER  
CONDITIONS OF STRESSCORROSION ATTACK. DUE TO  
PROBLEMS IN CONTRACT NEGOTIATION, THIS PROGRAM WAS  
DELAYED IN STARTING. HOWEVER, THE EXPERIMENTAL  
WORK, PLUS A LITERATURE STUDY, HAS BEEN INITIATED.  
PRELIMINARY ELECTRON METALLOGRAPHIC STUDIES OF THE  
STEEL HAVE BEEN CARRIED OUT IN THE PROCESS OF  
DEVELOPING TECHNIQUES. ELECTRON DIFFRACTION AND  
X-RAY DIFFRACTION RESULTS ARE BEING CORRELATED WITH  
THE MICROSTRUCTURE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-618 484

PICATINNY ARSENAL DOVER N J ARMY EXPLOSIVE ORDNANCE  
DISPOSAL CENTER

FEASIBILITY STUDY ON EOD APPLICATIONS FOR LIQUID  
NITROGEN.

(U)

DESCRIPTIVE NOTE: TECHNICAL MEMO.,

JUN 65 40P

VENNELL, ROBERT R. I

REPT. NO. TM-1667

PROJ: 1W523801A583 ,404C

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*FUZES(ORDINANCE),  
QUENCHING(INHIBITION)), (\*AMMUNITION COMPONENTS,  
DISPOSAL), (\*NITROGEN, LIQUEFIED GASES),  
(\*DETONATORS, QUENCHING(INHIBITION)),  
QUENCHING(COOLING), FAILURE(MECHANICS),  
EFFECTIVENESS, CRYOGENICS, DEGRADATION  
IDENTIFIERS: DEACTIVATION

(U)

(U)

A TEST PROGRAM WAS CONDUCTED TO DEVELOP A NEW MEANS  
OF INACTIVATION OF MUNITION COMPONENTS BY MEANS OF  
COOLING TO CRYOGENIC TEMPERATURES. THE COOLING  
MEDIUM USED WAS LIQUID NITROGEN AT A TEMPERATURE OF -  
320F. THREE FUZE ASSEMBLIES: THE M562, THE  
M524, THE M509 AND THEIR ELEMENTS WERE TESTED.  
WHILE SOME SUCCESS WAS ACHIEVED WITH THE MECHANICAL  
ELEMENTS OF TIMING FUZES (M562 AND M524), WHERE  
ALMOST 90% WERE RENDERED IMMOBILIZED, LIQUID  
NITROGEN HAD LITTLE EFFECT ON DETONATOR SENSITIVITY,  
PIEZO ELECTRIC CRYSTALS, AND CARBON BRIDGE TYPE  
ELECTRIC DETONATORS. (AUTHOR)

(U)



UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-619 399

TITANIUM METALS CORP OF AMERICA NEW YORK

DEVELOPMENT OF A STABLE-BETA TITANIUM ALLOY. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 9, 1 JUL-30 SEP 64,

SEP 64 41P HUNTER, D. B. ;

CONTRACT: DA30 0690RD3743

PROJ: 5933 2008

MONITOR: WAL ; TR-405/2-8

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-612 477.

DESCRIPTORS: (\*TITANIUM ALLOYS, DISPERSION HARDENING), (\*DISPERSION HARDENING, TITANIUM ALLOYS), VANADIUM ALLOYS, CHROMIUM ALLOYS, ALUMINUM ALLOYS, SILICON ALLOYS, GERMANIUM ALLOYS, IRON ALLOYS, COBALT ALLOYS, MOLYBDENUM ALLOYS, MANGANESE ALLOYS, HEAT TREATMENT, QUENCHING(COOLING), AGING(MATERIALS), TENSILE PROPERTIES, CREEP, HARDNESS, WELDS, OXIDATION, CORROSION, STRESSES (U)

IDENTIFIERS: TITANIUM ALLOY 3AL 10CR 1SI 17V, TITANIUM ALLOY 3AL 10CR 26E 17V, TITANIUM ALLOY 3AL 2CO 2FE 17V, TITANIUM ALLOY 3AL 2FE 8MO 8V, TITANIUM ALLOY 3AL 4FE 17V (U)

AN X-RAY EXAMINATION OF TI-17V-10CR-3AL-1SI REVEALED THE PRESENCE OF ALPHA AND TISSI3 LINES IN A SAMPLE QUENCHED FROM 2050F AND AGED AT 1250F. NO HARDENING RESPONSE UPON AGING AT 1250F WAS FOUND IN TI-17V-10CR-3AL-26E. ROOM TEMPERATURE TENSILE TESTS UPON AGEABLE BETA ALLOY TI-17V-2FE-2CO-3AL INDICATED THAT A YIELD STRENGTH OF 180,000 PSI WAS REACHED AFTER AGING FOR 8 HOURS AT 900F; AGING FOR 24 HOURS AT 800-900F PRODUCED YIELD STRENGTHS EXCEEDING 200,000 PSI. CREEP TESTS ON TI-8MO-8V-2FE3AL SHOWED THAT, WHEN AGED AT 900F FOR 8 HOURS, AFTER 500 HOURS EXPOSURE AT 600F, UNDER A LOAD OF 128,000 PSI, DEFORMATIONS DID NOT EXCEED 0.43%. TI-17V-4FE-3AL, EXPOSED UNDER SIMILAR CONDITIONS, SHOWED CREEP DEFORMATIONS OF 2%. OXIDATION AND STRESS CORROSION TESTS ON THE ABOVE ALLOYS INDICATED THAT TI-8MO-8V-2FE-3AL WAS THE SUPERIOR ALLOY. WELDABILITY TESTS ON AGEABLE BETA ALLOYS SUGGESTED THEIR PERFORMANCE WAS SIMILAR TO THE COMMERCIAL ALLOY TI-13V-11CR-3AL, WHEREAS THE TWO STABLE-BETA ALLOYS TI-17V-10MN-3AL . (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-623 019  
WATERVLIET ARSENAL N Y BENET LABS

THE HEATING OF METALS IN AN ELECTROLYTE.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
SEP 65 28P FRANKEL, HERBERT ;  
REPT. NO. WVT-6528  
PROJ: DA MI 3 23041 01M7M7

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•HEAT TREATMENT; METALS),  
(•ELECTROLYTES, HEATING), QUENCHING(COOLING),  
STEEL, HARDENING, ELECTRIC ARCS,  
TANKS(CONTAINERS)

(U)

STEEL CAN BE HEAT TREATED ELECTRICALLY WHILE SUBMERGED IN AN ELECTROLYTE. THE ADVANTAGES OF THIS PROCESS ARE: (1) RAPID HEATING, (2) PREVENTION OF SCALE BY THE AUTOMATIC GENERATION OF HYDROGEN WHICH SURROUNDS THE WORK, (3) AUTOMATIC QUENCH IN THE SAME TANK WHEN THE CURRENT IS INTERRUPTED. ON SMALL SAMPLES, HEATING RATES AS HIGH AS 350F PER SECOND AND AS LOW AS 6.6F PER SECOND HAVE BEEN ACHIEVED WITH THE LIKLIHOOD OF BEING ABLE TO INCREASE SUBSTANTIALLY THE RATE WITH HIGHER VOLTAGE. IN A 10% SOLUTION OF SODIUM CARBONATE, WHICH IS INEXPENSIVE AND CAN BE USED INDEFINITELY, CURRENT DENSITIES OF 21 TO 27 AMPERES PER SQUARE INCH AT 200 VOLTS WERE RECORDED DURING HEATING. DISADVANTAGES OF THE PROCESS INCLUDE: (1) A LARGE D. C. GENERATOR IS REQUIRED FOR MODERATELY LARGE PIECES, (2) THE PROCESS IS LESS THAN 12% EFFICIENT, (3) PROTECTED THERMOCOUPLES MUST BE ATTACHED TO THE WORK, (4) ALTHOUGH NOT REQUIRED FOR SMALL SAMPLES, AN EXHAUST SYSTEM WOULD BE REQUIRED TO REMOVE THE LIBERATED HYDROGEN WHEN HEATING LARGE PIECES, (5) TEMPERATURES INDUCED ARE NOT UNIFORM THROUGHOUT THE SPECIMEN.  
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-625 475 11/6 18/8 18/10  
COMISION NACIONAL DE ENERGIA ATOMICA BUENOS AIRES  
(ARGENTINA) DEPARTAMENTO DE METALURGIA

POINT DEFECTS AND MECHANICAL PROPERTIES OF  
COLUMBIUM.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 15 FEB 62-30 NOV 65,  
NOV 65 39P COLL, JORGE A. IDI PRIMIO,  
JUAN C. IBISOGLI, EDGARDO I  
CONTRACT: DA-ARO-49-092-63-620 , DA-ARO-49-092-64-  
644  
PROJ: DA-20014501B32D-00-003-LA

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*NIOBIUM, RADIATION DAMAGE),  
(\*RADIATION DAMAGE, NIOBIUM), ARGENTINA, HIGH-  
TEMPERATURE RESEARCH, REACTOR MATERIALS, HARDNESS,  
QUENCHING(COOLING), IMPURITIES, CRYSTAL LATTICE  
DEFECTS, DEFORMATION, RESISTANCE(ELECTRICAL),  
MECHANICAL PROPERTIES, EXPERIMENTAL DATA

(U)

THE RESULTS OF TWO AND A HALF YEARS OF EXPERIMENTAL  
WORK ARE PRESENTED IN THE FORM OF CONCLUSIONS, FIVE  
TABLES AND NINE GRAPHS. ALSO INCLUDED ARE  
PHOTOGRAPHS AND DIAGRAMS OF THE EXPERIMENTAL SET UP.  
RESULTS OF R VS T FOR CB SHOW AGREEMENT WITH  
OTHERS UP TO 1000C RESULTS CAN BE EXPRESSED BY  
 $R_{SUBT} = R(10C)(1 - AT - BT SQUARED)$   
WHICH DIFFERS FROM LINEAR RELATIONSHIP OBTAINED  
ELSEWHERE. BECAUSE OF QUENCHING SOME KIND OF  
DEFECTS CAN BE RETAINED IN CB CONTAINING CERTAIN  
AMOUNT OF INTERSTITIAL IMPURITIES. A MINIMUM DOSE  
OF 1.10 TO THE 17TH POWER NEUTRONS/SQ CM IS NECESSARY  
TO PRODUCE A MEASURABLE INCREASE IN THE HARDNESS OF  
POLYCRYSTALLINE CB. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-625 591 20/9 7/2  
RESEARCH INST TEMPLE UNIV PHILADELPHIA PA

PLASMA JET CHEMISTRY.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,  
DEC 64 37P STOKES, C. S. ICAHILL, J. A. I  
CORREA, J. J. IGROSSE, A. V. I  
CONTRACT: AF-AFOSR-62-196  
PROJ: AF-9750  
TASK: 975001  
MONITOR: AFOSR , 65-1802

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*PLASMA JETS, SYNTHESIS(CHEMISTRY)),  
(\*SYNTHESIS(CHEMISTRY), PLASMA JETS), HELIUM  
GROUP GASES, CATHODES, POWDERS, NITROGEN,  
TUNGSTEN, ANODES, HELIUM, ARGON, RELEASE  
MECHANISMS, METALS, CHEMICAL COMPOUNDS, OXIDES,  
REDUCTION(CHEMISTRY), REFRACTORY METALS,  
NITRIDES, CARBIDES, RINGS,  
QUENCHING(COOLING), HIGH-TEMPERATURE RESEARCH (U)

THREE TYPES OF PLASMA JETS ARE DESCRIBED: A  
NOBLE GASES PLASMA JET, A NITROGEN PLASMA JET, AND A  
PLASMA JET CATHODE AS CHEMICAL FEEDER. POWDER  
FEEDING DEVICES AND QUENCHING DEVICES ARE CONSIDERED.  
THE USE OF THE PLASMA JET IS DESCRIBED FOR SEVERAL  
CHEMICAL REACTIONS: METAL OXIDES REDUCTION,  
REFRACTORY METALS NITRIDES FORMATION, AND REFRACTORY  
METALS CARBIDES FORMATION. THE TEMPERATURES  
ATTAINABLE WITH PLASMA JETS ARE IN THE RANGE OF  
5000K TO 50,000K. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-628 979 13/8 11/6  
DAVID TAYLOR MODEL BASIN WASHINGTON D C STRUCTURAL  
MECHANICS LAB

EFFECTS OF TEMPERING ABOVE THE LOWER CRITICAL  
TEMPERATURE A SUB C1 ON THE PROPERTIES OF AN HY-80  
STEEL. (U)

DESCRIPTIVE NOTE: PROGRESS REPT. NO. 6,  
JAN 66 29P WILLNER, ABNER R. ISALIVE,  
MARCEL L. I  
REPT. NO. DTMB-2140  
PROJ: S-R001-01-01,  
TASK: 0401,

UNCLASSIFIED REPORT

DESCRIPTORS: (\*STEEL, TEMPERING), MECHANICAL  
PROPERTIES, TEMPERATURES, MICROSTRUCTURE, NOTCH  
TOUGHNESS, METAL PLATES, TRANSITION TEMPERATURE,  
QUENCHING(COOLING), TENSILE PROPERTIES, WELDS,  
FRACTURE(MECHANICS), METALLOGRAPHY,  
TRANSFORMATIONS (U)  
IDENTIFIERS: STEEL HY-80 (U)

THE EFFECTS OF TEMPERING ABOVE THE CRITICAL  
TRANSFORMATION TEMPERATURE ON THE MICROSTRUCTURE,  
NOTCH-TOUGHNESS AND MECHANICAL PROPERTIES OF HY-80  
STEEL WAS INVESTIGATED. THE FORMATION OF ALPHA  
FERRITE AND PRIME MARTENSITE AFTER TEMPERING ABOVE  
THE LOWER CRITICAL TEMPERATURE AND QUENCHING WILL  
RESULT IN MECHANICAL PROPERTIES THAT FALL BELOW THE  
REQUIREMENTS OF THE HY-80 SPECIFICATION.  
RETEMPERING TO ACHIEVE MINIMUM YIELD STRENGTHS MAY  
RESULT IN NONUNIFORM YIELD STRENGTH DISTRIBUTION.  
THE POSSIBILITY OF UNDERBEAD CRACKING DUE TO ALLOY  
SEGREGATION IS ALSO DISCUSSED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-634 220 11/6  
ALBERTA UNIV EDMONTON

TRANSFORMATIONS IN FE-CR ALLOYS.

(U)

JUN 65 4P WALLBRIDGE, J. N. PARR, J.  
GORDON I

UNCLASSIFIED REPORT

AVAILABILITY: PUBLISHED IN JOURNAL OF THE IRON AND  
STEEL INSTITUTE, V204 P119-21 FEB 1966.

SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH THE  
UNIVERSITY OF WINDSOR, ONTARIO.

DESCRIPTORS: (\*IRON ALLOYS, \*CHROMIUM ALLOYS),  
(\*TRANSFORMATIONS, IRON ALLOYS), CANADA, CHROMIUM  
ALLOYS, MARTENSITE, TRANSITION TEMPERATURE,  
QUENCHING(COOLING), SURFACE PROPERTIES,  
DEFORMATION

(U)

COOLING CURVES FOR FE-CR ALLOYS (0.5 TO 10  
AT-% CR) AT RATES TO 114000 DEGC/S HAVE BEEN  
OBTAINED. ALLOYS CONTAINING 0.5-2 AT-% CR SHOWED  
NO SURFACE RUMPLING! IN THE OTHER ALLOYS BOTH  
MASSIVE AND MARTENSITIC TRANSFORMATION (ACCORDING  
TO THE CONVENTIONAL CRITERION) WERE OBSERVED.  
THE WORK SHOWS THE UNRELIABILITY OF THE SURFACE  
RUMPLING CRITERION AS AN INDICATION OF MARTENSITIC  
TRANSFORMATION! AND THERE APPEARS TO BE A PARALLEL  
BEHAVIOUR BETWEEN THE BINARY ALLOYS OF FE-MN AND  
FE-CR. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZONCI

AD-634 960 14/2  
NATIONAL RESEARCH COUNCIL OF CANADA OTTAWA (ONTARIO) DIV  
OF APPLIED PHYSICS

PLATINUM RESISTANCE THERMOMETRY IN THE RANGE 630-  
900C, (U)

DEC 65 12P BERRY, R. J. ;  
MONITOR: NRC 8973

UNCLASSIFIED REPORT

AVAILABILITY: PUBLISHED IN METROLOGIA V2 P92-3 APR  
1966.

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*RESISTANCE THERMOMETERS, PLATINUM),  
CANADA, RESISTANCE(ELECTRICAL), ELECTRIC  
INSULATION, LEAKAGE(ELECTRICAL), STABILITY,  
HIGH-TEMPERATURE RESEARCH, QUENCHING(COOLING),  
PERFORMANCE(ENGINEERING) (U)

THE PERFORMANCE OF COMMERCIALY PRODUCED, STANDARD  
PLATINUM RESISTANCE THERMOMETERS HAS BEEN  
INVESTIGATED IN THE REGION 630 - 900C. PARTICULAR  
ATTENTION WAS PAID TO RESISTANCE STABILITY, QUENCHING  
EFFECTS, AND ELECTRICAL INSULATION LEAKAGE. THE  
LIMIT OF 900C WAS DICTATED BY THE USE OF MICA  
INSULATION IN THESE INSTRUMENTS. THE MOST SERIOUS  
PROBLEM ENCOUNTERED WAS THAT OF INSULATION LEAKAGE AT  
BOTH HIGH AND LOW TEMPERATURES. THE LOW  
TEMPERATURE LEAKAGE WAS DUE TO WATER THAT HAD BEEN  
RELEASED FROM MICA INSULATION WHEN THE THERMOMETERS  
WERE USED AT HIGH TEMPERATURES, AND THIS PROBLEM IS  
STUDIED IN SOME DETAIL HERE. A RELATIONSHIP  
BETWEEN THE MAGNITUDE OF THE GALVANOMETER 'WET KICK'  
AND THE INSULATION RESISTANCE HAS BEEN ESTABLISHED.  
THE USEFUL LIFETIME OF THE DRY AIR FILLING IN A  
THERMOMETER HAS BEEN ESTIMATED FOR VARIOUS CONDITIONS  
OF USE. BASED ON THESE STUDIES, PROCEDURES HAVE  
BEEN RECOMMENDED FOR STABILIZING PLATINUM RESISTANCE  
THERMOMETERS, ANNEALING-OUT QUENCHING EFFECTS, AND  
REDUCING INSULATION LEAKAGE OVER THIS TEMPERATURE  
RANGE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-635 697 11/6 20/12  
WAYNE STATE UNIV DETROIT MICH DEPT OF METALLURGICAL  
ENGINEERING

THE NI3AL ORDERING SYSTEM.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.

JUN 66 30P COREY, CLARK L. ILISOWSKY,  
BEGDAN ;  
REPT. NO. TR-1,  
CONTRACT: NONR-4520(00),  
PROJ: NR-031-703,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*NICKEL ALLOYS, PHASE STUDIES),  
(\*ALUMINUM ALLOYS, PHASE STUDIES),  
RESISTANCE(ELECTRICAL), X-RAY SPECTRUM,  
MICROSTRUCTURE, GRAIN STRUCTURES(METALLURGY),  
CRYSTAL LATTICES, QUENCHING(COOLING)  
IDENTIFIERS: ORDER-DISORDER THEORY

(U)

(U)

ELECTRICAL RESISTIVITY, X-RAY LINE POSITIONS,  
DEGREE OF ORDER, AND MICROSTRUCTURES HAVE BEEN  
INVESTIGATED FOR NI-AL ALLOYS NEAR THE NI3AL  
COMPOSITION. THE RESULTS INDICATE THAT NI3AL  
UNDERGOES DISORDERING BETWEEN 1250C AND THE M.P.,  
ALSO SUPERSATURATED GAMMA, PRODUCED IN GAMMA +  
GAMMA' ALLOYS BY GAS-QUENCHING, IS EXTENSIVELY  
ORDERED PRIOR TO GAMMA' (NI3AL) PHASE  
SEPARATION. THE LATTER REACTION, IF NOT BOTH, MUST  
FOLLOW THE COOPERATIVE PHENOMENA MODEL. SHIFTS IN  
LINE POSITION AS A FUNCTION OF QUENCH-INDUCED  
SUPERSATURATION ARE SHOWN. LATTICE PARAMETERS OF  
EQUILIBRIUM AND NON-EQUILIBRIUM PHASES ARE GIVEN.  
(AUTHOR)

(U)



UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-639 056 11/6 20/2 13/8  
PENNSYLVANIA UNIV PHILADELPHIA SCHOOL OF METALLURGICAL  
ENGINEERING

AN ELECTRON MICROSCOPE STUDY OF QUENCHED GOLD-  
PALLADIUM ALLOYS. I. A STUDY OF THE ELECTRICAL  
RESISTIVITY CHANGES PRODUCED BY QUENCHING AU PD  
ALLOYS. II. THE EFFECT OF QUENCHED-IN VACANCIES ON  
THE MECHANICAL PROPERTIES OF GOLD-PALLADIUM ALLOYS.  
III. (U)

DESCRIPTIVE NOTE: ANNUAL SUMMARY REPT, 1 OCT 65-30 SEP  
66.

SEP 66 3P  
CONTRACT: NONR-551(55),

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*GOLD ALLOYS, \*CRYSTAL LATTICE  
DEFECTS), PALLADIUM ALLOYS, FOILS, ELECTRON  
MICROSCOPY, RESISTANCE(ELECTRICAL), MECHANICAL  
PROPERTIES, QUENCHING(COOLING), SINGLE CRYSTALS,  
WIRE (U)

A STUDY WAS MADE OF POINT DEFECTS IN BINARY ALLOYS.  
THERE ARE THREE PHASES OF THE RESEARCH, THE FIRST  
CONCERNED WITH ELECTRON MICROSCOPY OF GOLD-PALLADIUM  
FOILS, THE SECOND WITH ELECTRICAL RESISTIVITY CHANGES  
PRODUCED BY QUENCHING IN SIMILAR COMPOSITION ALLOYS,  
AND THE LAST CONCERNED WITH THE EFFECT OF QUENCHING  
ON MECHANICAL PROPERTIES OF THESE ALLOYS. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-639 092 20/13  
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF  
METALLURGY

COOLING RATES IN SPLAT COOLING.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.  
SEP 66 32P RUHL, ROBERT C. I  
REPT. NO. TR-12,  
CONTRACT: NONR-1841(38),  
PROJ: DSR-7618,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*COOLING, LIQUID METALS), (\*THERMAL  
CONDUCTIVITY, COOLING), LIQUIDS,  
QUENCHING(COOLING), EXPERIMENTAL DATA  
IDENTIFIERS: SPLAT COOLING

(U)

(U)

CALCULATIONS AND EXPERIMENTAL OBSERVATIONS MADE ON  
COOLING RATES DURING SPLAT QUENCHING ARE PRESENTED.  
THREE POSSIBLE TYPES OF COOLING BEHAVIOR ARE  
DISCUSSED: IDEAL COOLING, INTERMEDIATE COOLING,  
AND NEWTONIAN COOLING. THE EFFECTS OF SPLATTING-  
PROCESS VARIABLES ON THE COOLING RATES ARE DESCRIBED,  
THE MOST IMPORTANT OF THESE VARIABLES BEING SPLAT  
THICKNESS AND THE QUALITY OF THE THERMAL CONTACT  
BETWEEN THE SPLAT AND SUBSTRATE. SPLAT-COOLING  
RATES RANGE TYPICALLY FROM 10,000 TO ABOVE 10 TO THE  
10TH POWER C/SEC., DEPENDING ON THE ACTUAL  
CONDITIONS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-641 786 11/6 20/12  
ILLINOIS UNIV URBANA

AN INTERNAL FRICTION STUDY OF VACANCIES IN A QUENCHED  
AU-NI SOLID SOLUTION. (U)

DESCRIPTIVE NOTE: INTERIM REPT.,  
MAY 65 6P COST, J. R. I  
CONTRACT: AF-AFOSR-633-64  
PROJ: AF-9763  
TASK: 976301  
MONITOR: AFOSR 66-1601

UNCLASSIFIED REPORT

AVAILABILITY: PUBLISHED IN ACTA METALLURGICA V13  
P1263-7 DEC 1965.

SUPPLEMENTARY NOTE: REVISION OF MANUSCRIPT SUBMITTED 8  
MAR 65.

DESCRIPTORS: (\*GOLD ALLOYS, INTERNAL FRICTION),  
(\*NICKEL ALLOYS, INTERNAL FRICTION), (\*INTERNAL  
FRICTION, RELAXATION TIME), ANNEALING,  
QUENCHING(COOLING), THERMODYNAMICS, CRYSTAL  
SUBSTRUCTURE, SOLID SOLUTIONS (U)  
IDENTIFIERS: ZENER RELAXATION (U)

CHANGES IN THE VACANCY CONCENTRATION IN A QUENCHED  
AU-30 AT.% NI ALLOY ARE FOLLOWED USING ISOTHERMAL  
INTERNAL FRICTION MEASUREMENTS OF THE ZENER  
RELAXATION RATE. ANALYSIS OF THE VACANCY ANNEALING  
YIELDS A VALUE OF APPROXIMATELY 21 KCAL/MOLE FOR THE  
ENERGY FOR VACANCY MOTION. FROM THIS ENERGY OF  
MOTION, TYPICAL RATES OF SHIFTING OF THE ZENER PEAK  
TEMPERATURE ARE OBTAINED. THIS PEAK SHIFT IS USED  
TO INTERPRET A PREVIOUSLY UNEXPLAINED INTERNAL  
FRICTION PEAK OBSERVED IN THIS ALLOY. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-643 302 13/8 7/4  
NORTHWESTERN UNIV EVANSTON ILL DEPT OF MATERIALS  
SCIENCE

SPINODAL DECOMPOSITION DURING CONTINUOUS COOLING.

(U)

NOV 65 12P HUSTON, E. L. ; CAHN, JOHN W. ;  
HILLIARD, J. E. ;  
CONTRACT: DA-31-124-AROD-233  
MONITOR: AROD 4975:3

UNCLASSIFIED REPORT

AVAILABILITY: PUBLISHED IN ACTA METALLURGICA V14  
P1053-62 SEP 1966.

DESCRIPTORS: (\*SOLID SOLUTIONS, DECOMPOSITION),  
(\*COOLING, \*DECOMPOSITION), TRANSFORMATIONS,  
PHASE STUDIES, QUENCHING(COOLING), THEORY

(U)

SPINODAL DECOMPOSITION OF A BINARY SOLID SOLUTION DURING CONTINUOUS COOLING SHOULD LEAD TO A STRUCTURE THAT IS SIMILAR TO THAT RESULTING FROM ISOTHERMAL DECOMPOSITION, CONSISTING OF A SUPERIMPOSITION OF SINUSOIDALLY VARYING COMPOSITION MODULATIONS CLUSTERED ABOUT A WAVELENGTH  $\lambda_{SUB\ MAX}$  THAT HAS RECEIVED MAXIMUM AMPLIFICATION. FOR QUENCH RATES WHICH ARE FAST ENOUGH TO PRECLUDE COMPLETE DECOMPOSITION, THE PROFILE OF THE COMPOSITION-AMPLITUDE SPECTRUM IS INDEPENDENT OF QUENCH RATE AND THE LOGARITHM OF THE AMPLITUDE IS INVERSELY PROPORTIONAL TO THE QUENCH RATE. WITH SLOWER QUENCH RATES IN WHICH COMPLETE DECOMPOSITION OCCURS  $\lambda_{SUB\ MAX}$  INCREASES AS THE  $-(1/6)$  POWER OF THE QUENCH RATE. THE LIMITING COOLING RATE REQUIRED TO SUPPRESS DECOMPOSITION, AS WELL AS THE COMPOSITION DEPENDENCE OF  $\lambda_{SUB\ MAX}$ , ARE ALSO OBTAINED. THESE RESULTS HAVE BEEN SUMMARIZED AS ISOTHERMAL-TRANSFORMATION AND CONTINUOUS-COOLING-TRANSFORMATION DIAGRAMS FOR SPINODAL DECOMPOSITION. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-643 452 20/2  
PENNSYLVANIA STATE UNIV UNIVERSITY PARK MATERIALS RESEARCH  
LAB

EXPERIMENTAL CONFIRMATION OF MAJOR CHANGE OF DEFECT  
TYPE WITH TEMPERATURE AND COMPOSITION IN IONIC  
SOLIDS. (U)

MAR 66 4P DINESS, A. M. IROY, RUSTUM I  
CONTRACT: AF-AFOSR-208-63  
PROJ: AF-9761  
TASK: 976102  
MONITOR: AFOSR 66-2150

UNCLASSIFIED REPORT  
AVAILABILITY: PUBLISHED IN SOLID STATE  
COMMUNICATIONS V3 P123-5 1965.

DESCRIPTORS: (CRYSTAL LATTICE DEFECTS, CERAMIC  
MATERIALS), ZIRCONIUM COMPOUNDS, OXIDES, CALCIUM  
COMPOUNDS, DOPING, QUENCHING (COOLING), HIGH-  
TEMPERATURE RESEARCH, DENSITY (U)

THE CHANGE OF PREDOMINANT POINT DEFECT-TYPE FROM  
INTERSTITIAL CATIONS TO ANION VACANCIES IS PRESENTED  
AS A FUNCTION OF TEMPERATURE AND CONCENTRATION FOR  
THE FLUORITE-TYPE CRYSTALLINE SOLUTION FIELD IN THE  
SYSTEM  $ZrO_2$ - $CaO$ . THE CHARACTERIZATION OF THE  
POINT DEFECT CONTENT OF THESE MATERIALS IS BASED UPON  
EXPERIMENTAL DETERMINATIONS OF DENSITIES AND  
PRECISION X-RAY LATTICE PARAMETERS.  
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-646 104 11/6 7/4  
NORTH CAROLINA STATE UNIV RALEIGH DEPT OF ENGINEERING  
RESEARCH

DIE KOBALTECKE IM DREISTOFFSYSTEM KOBALT--MOLYBDAN--  
BOR, (COBALT IN THE TERNARY SYSTEM COBALT -  
MOLYBDENUM-BORON), (U)

AUG 66 8P STADELMAIER, H. H. DAVIS, H. H.

CONTRACT: DA-31-124-ARO(D)-277  
PROJ: DA-200145-01832D  
MONITOR: AROD 5010:10

UNCLASSIFIED REPORT

AVAILABILITY: PUBLISHED IN MONATSSHEFTE FUR CHEMIE  
V97 N5 P149-4 1966.

SUPPLEMENTARY NOTE: TEXT IN GERMAN.

DESCRIPTORS: (\*COBALT ALLOYS, PHASE STUDIES),  
(\*MOLYBDENUM ALLOYS, PHASE STUDIES), (\*BORON  
ALLOYS, PHASE STUDIES), QUENCHING(COOLING),  
CRYSTAL STRUCTURE (U)

THE EQUILIBRIA IN THE TERNARY SYSTEM COBALT--  
MOLYBDENUM--BORON WERE INVESTIGATED IN THE REGION  
AROUND TAU (CR23C6 STRUCTURE) AND COMOB  
(UNKNOWN STRUCTURE). IN ALLOYS QUENCHED FROM  
800C THE COMPOSITION OF TAU IS FOUND AT  
CO21.7MO1.3B6. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-646 455 11/6 20/2  
PENNSYLVANIA UNIV PHILADELPHIA SCHOOL OF METALLURGICAL  
ENGINEERING

ELECTRON MICROSCOPE OBSERVATIONS OF QUENCHED AND AGED  
GOLD AND GOLD-PALLADIUM ALLOYS, (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
JAN 67 94P COOK, ROGER H. ; HADDIN,  
ROBERT ;  
REPT. NO. TR-1  
CONTRACT: NONR-551(55)  
PROJ: NR-031-528

UNCLASSIFIED REPORT

DESCRIPTORS: (GOLD ALLOYS, CRYSTAL LATTICE  
DEFECTS), (CRYSTAL LATTICE DEFECTS, PALLADIUM  
ALLOYS), QUENCHING(COOLING), AGING(MATERIALS),  
ELECTRON MICROSCOPY, CRYSTALLOGRAPHY, MELTING  
POINT, CRYSTAL STRUCTURE, FOILS, CRYSTAL  
LATTICES (U)

A REVIEW OF PAST WORK ON THE BEHAVIOR OF VACANCIES  
IN QUENCHED METALS IS PRESENTED, WITH EMPHASIS UPON  
GOLD AND TRANSMISSION ELECTRON MICROSCOPY DATA.  
RESULTS ARE PRESENTED ON AU, AU-5 AT% PD, AND  
AU-10 AT% PD FOILS QUENCHED FROM 0.875 TM (TM  
= ABSOLUTE MELTING TEMPERATURE) AND EXAMINED IN  
AN ELECTRON MICROSCOPE. IT IS FOUND THAT INCREASING  
PALLADIUM CONTENT CAUSES AN INCREASE IN THE NUMBER OF  
FAULTED DISLOCATION LOOPS IN THE QUENCHED AND AGED  
MATERIAL AND IN THE CONCENTRATION OF VACANCIES  
ANNIHILATED AT SUCH LOOPS. HOWEVER STACKING FAULT  
TETRAHEDRA REPRESENT THE MOST IMPORTANT SINKS IN ALL  
CASES. SOME REASONS FOR THE INCREASED IMPORTANCE  
OF DISLOCATION LOOPS AS VACANCY SINKS IN THE ALLOYS  
ARE DISCUSSED. CHANGES IN STACKING FAULT ENERGY DUE  
TO ALLOYING ARE NOT THOUGHT SIGNIFICANT IN PRODUCING  
THIS EFFECT. POSSIBLE ROLES OF NUCLEUS  
CONFIGURATIONS ARE DISCUSSED AND A MODEL IS PRESENTED  
IN WHICH TETRAHEDRA BECOME LESS EFFECTIVE AS SINKS AS  
THEIR GROWTH PROCEEDS, OWING TO CHANGES IN SOLUTE  
CONCENTRATION NEAR THEM. HOWEVER THE EFFECTIVENESS  
OF LOOPS AS SINKS IS NOT EXPECTED TO CHANGE  
SIGNIFICANTLY DURING AGEING WITH THE RESULT THAT  
DISLOCATION LOOPS CAN BECOME THE MAIN SINKS IN THE  
LATER STAGES OF AGEING. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-649 313 13/8 13/4  
EDGEWOOD ARSENAL MD

VACUUM (OR FLUXLESS) BRAZING-GAS QUENCHING OF 6061  
ALUMINUM ALLOY. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
MAR 67 41P GURTNER, FRANCIS B. ISHUTT,  
PAUL K. , JR.; SCHWARTZ, MELVIN M. I  
REPT. NO. EA-TR-4085

UNCLASSIFIED REPORT

DESCRIPTORS: (\*ALUMINUM ALLOYS, \*CONTAINERS),  
(\*BRAZING, ALUMINUM ALLOYS),  
(\*QUENCHING (COOLING), ALUMINUM ALLOYS),  
VACUUM APPARATUS, HELIUM, ARGON, COMPATIBILITY (U)  
IDENTIFIERS: ALUMINUM ALLOY 6061 (U)

AN INVESTIGATION WAS MADE TO PROVIDE A PROCESS OR METHOD FOR PRODUCING HELIUM LEAK-TIGHT CONTAINERS UNDER CONTROLLED PROCESSING AND THEREFORE WITH A HIGH LEVEL OF COMPATIBILITY. THE CONCEPT EVOLVED AROUND COMBINING VACUUM BRAZING AND GAS QUENCHING INTO ONE OPERATION. THE PARTS WERE QUENCHED IN THE FURNACE AFTER BRAZING OR SOLUTION TREATING. THE ADVANCE INTO THE FIELD OF VACUUM BRAZING-GAS QUENCHING HAS PROVIDED A DEFINITE ADVANCE IN THE FIELD OF MANUFACTURING FOR HIGH OR LOW VOLUMES OF ITEMS. AS A RESULT OF THE INVESTIGATION, THE FOLLOWING CONCLUSIONS WERE DRAWN: (1) VACUUM BRAZING-GAS QUENCHING IS FEASIBLE FOR PRODUCTION QUANTITIES OF COMPLEX AND SIMPLE ITEMS. (2) THE APPLICATION OF SUCH A PROCESS IS NOT LIMITED TO 6061 ALUMINUM, BUT CAN BE EXTENDED TO FERROUS AND NONFERROUS ALLOYS. (3) THE FUTURE FOR A PROCESS SUCH AS VACUUM BRAZING-GAS QUENCHING IS UNLIMITED AT THE PRESENT TIME. (AUTHOR) (U)



UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-652 100 13/8  
UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES

THE ROLE OF IMPERFECTION CHEMISTRY IN THE  
CHARACTERIZATION OF MATERIALS,

(U)

DEC 66 17P KROGER, F. A. I  
CONTRACT: AF-AFOSR-986-66  
PROJ: AF-9710  
TASK: 971003  
MONITOR: AFOSR 67-1091

UNCLASSIFIED REPORT

AVAILABILITY: PUBLISHED IN MATERIALS RESEARCH  
BULLETIN V2 P203-16 1967.

SUPPLEMENTARY NOTE: PRESENTED AT THE INTERNATIONAL  
CONFERENCE ON THE CHARACTERIZATION OF MATERIALS,  
UNIVERSITY PARK, PENNSYLVANIA, NOV 16-18, 1966.

DESCRIPTORS: (\*DEFECTS(MATERIALS), CHEMICAL  
ANALYSIS), (\*CRYSTAL STRUCTURE, PHASE STUDIES),  
CADMIUM, TELLURIUM, THERMODYNAMICS, CHEMICAL  
PRECIPITATION, QUENCHING(COOLING), DOPING

(U)

FOR A COMPLETE CHARACTERIZATION OF A CRYSTALLINE  
MATERIAL IT IS NECESSARY TO SUPPLEMENT THE CLASSIC  
CHARACTERIZATION DATA SUCH AS THE CHEMICAL  
COMPOSITION, THE CRYSTAL STRUCTURE AND THE GROSS  
THERMODYNAMIC PARAMETERS BY INFORMATION CONCERNING  
THE TYPES OF NATIVE AND FOREIGN DEFECTS AND THE  
THERMODYNAMIC PARAMETERS REGULATING THEIR FORMATION.  
FOR QUENCHED CRYSTALS, DATA REFERRING TO THE METHOD  
OF PREPARATION AND QUENCHING, AND THE PARAMETERS OF  
POSSIBLE PRECIPITATION PROCESSES INVOLVING BOTH THE  
PHASE DIAGRAM AND KINETIC DATA, ARE REQUIRED IN  
ADDITION. THE SITUATION IN PURE AND DOPED CDTE  
IS DISCUSSED AS AN EXAMPLE.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-652 132 20/3 11/6  
MASSACHUSETTS INST OF TECH CAMBRIDGE NATIONAL MAGNET  
LAB

MAGNETIC PROPERTIES OF SUPERCONDUCTING MO-RE  
ALLOYS.

(U)

DESCRIPTIVE NOTE: REVISED ED.,  
SEP 66 7P LERNER, E. IDAUNT, J. G. ;  
MAXWELL, E. ;  
CONTRACT: AF 49(638)-1468  
PROJ: AF-9764  
MONITOR: AFOSR 67-1010

UNCLASSIFIED REPORT

AVAILABILITY: PUBLISHED IN THE PHYSICAL REVIEW  
V153 N2 P487-92 JAN 10 1967.  
SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH OHIO  
STATE UNIV., COLUMBUS. REVISION OF MANUSCRIPT  
SUBMITTED 25 MAR 66.

DESCRIPTORS: (\*MOLYBDENUM ALLOYS, \*RHENIUM  
ALLOYS), (\*SUPERCONDUCTIVITY, \*MAGNETIC  
PROPERTIES), WIRE, ANNEALING, PHASE STUDIES,  
MAGNETIC FIELDS, TRANSITION TEMPERATURE,  
RESISTANCE(ELECTRICAL), SUPERCONDUCTORS,  
MAGNETIC MOMENTS, THERMAL CONDUCTIVITY,  
QUENCHING(COOLING)

(U)

THIS PAPER GIVES DETAILS OF RESEARCH CARRIED OUT ON  
THE LOW-TEMPERATURE PROPERTIES OF MO-RE ALLOYS IN  
THE SUPERCONDUCTING STATE. MEASUREMENTS WERE MADE  
ON A 52-48% ALLOY OF MO-RE BOTH UNANNEALED AND  
ANNEALED, THE ALLOY BEING IN THE FORM OF FINE WIRES.  
MICROGRAPH STUDIES WERE MADE TO DETERMINE THE  
PERCENTAGE OF THE VARIOUS PHASES PRESENT IN EACH  
SPECIMEN. THE LOW-TEMPERATURE MEASUREMENTS COVERED  
OBSERVATIONS OF THE MAGNETIZATION AS A FUNCTION OF  
APPLIED MAGNETIC FIELD AT VARIOUS TEMPERATURES USING  
TWO DIFFERENT TECHNIQUES. THE MEASUREMENTS YIELDED  
THE CRITICAL MAGNETIC FIELDS  $H_{C1}$  AND  $H_{C2}$  AS A  
FUNCTION OF TEMPERATURE AND OF THE STATE OF ANNEAL,  
AS WELL AS OF THE TRANSITION TEMPERATURE  $T_C$ .  
ESTIMATES WERE MADE OF  $H_C(T)$  AND THE  
GINZBURG-LANDAU-ABRIKOSOV-GOR'KOV AND MAKI  
PARAMETERS  $KAPPA$ ,  $KAPPA_1(T)$ , AND  $KAPPA_3(T)$ .  
COMPARISONS OF THE RESULTS ARE MADE WITH RESULTS  
OBTAINED PREVIOUSLY BY US FROM RESISTIVITY  
MEASUREMENTS ON THE SAME ALLOY AND BY OTHER AUTHORS  
ON SIMILAR SUPERCONDUCTING ALLOYS; THE COMPARISONS  
SHOW CONSISTENCY IN THE DATA.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-652 399 11/2  
LINDEN LABS INC STATE COLLEGE PA

CHEMICAL STRENGTHENING OF CERAMIC MATERIALS. (U)

DESCRIPTIVE NOTE: SUMMARY REPT., 7 APR 66-6 APR 67,  
APR 67 156P KIRCHNER, HENRY P. IGRUVER,  
ROBERT M. I PLATTS, DENNIS R. I WALKER, RALPH  
E. I  
CONTRACT: NOW-66-0441

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-634 361.

DESCRIPTORS: (CERAMIC MATERIALS, MECHANICAL  
PROPERTIES), ALUMINA, SPINELS, MAGNESIUM OXIDES,  
SILICON DIOXIDE, TITANIUM COMPOUNDS, NICKEL  
COMPOUNDS, OXIDES, MINERALS,  
FAILURE (MECHANICS), INHIBITION, COMPRESSIVE  
PROPERTIES, FLEXURAL STRENGTH, THERMAL SHOCK,  
ADDITIVES, HEAT TREATMENT, SURFACE PROPERTIES,  
CERAMIC COATINGS, QUENCHING (COOLING) (U)  
IDENTIFIERS: CORDIERITE, FORSTERITE, NICKELOUS  
OXIDE, STEATITE, TITANIUM DIOXIDE (U)

AN INVESTIGATION OF THE EFFECT OF COMPRESSIVE  
SURFACE LAYERS ON THE STRENGTH OF POLYCRYSTALLINE  
CERAMIC BODIES IS DESCRIBED. LOW EXPANSION SURFACE  
LAYERS WERE FORMED ON CONVENTIONAL CERAMICS BY  
CHEMICAL REACTIONS AT HIGH TEMPERATURES. FAILURE,  
BY SHEARING OF THE SURFACE LAYERS, WAS PREVENTED BY  
ESTABLISHING GRADUAL VARIATIONS IN COMPOSITION WITHIN  
THE BODY. CHEMICAL STRENGTHENING WAS ATTEMPTED  
WITH ALUMINA, TITANIA, SPINEL, MAGNESIA, FORSTERITE,  
STEATITE, NICKEL OXIDE, SILICA AND CORDIERITE BODIES  
AND WAS ACHIEVED WITH SEVERAL OF THESE MATERIALS.  
GLAZING AND QUENCHING ALSO RESULTED IN IMPROVED  
FLEXURAL STRENGTH. COMBINED PROCESSES INVOLVING  
CHEMICAL STRENGTHENING, ATMOSPHERIC TREATMENTS,  
GLAZING AND QUENCHING WERE INVESTIGATED. IN SOME  
CASES STRENGTH INCREASES OF MORE THAN 90% WERE  
OBSERVED. THE THERMAL SHOCK RESISTANCE OF SOME OF  
THE SAMPLES WAS IMPROVED. ABRASION OF THE SURFACES  
OF SOME OF THE TREATED SAMPLES DID NOT RESULT IN LOSS  
OF STRENGTH. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZONCI

AD-652 947 11/6  
WINDSOR UNIV (ONTARIO)

TRANSFORMATIONS IN FE-CO ALLOYS,

(U)

66 3P PARR, J. GORDON I

UNCLASSIFIED REPORT

AVAILABILITY: PUBLISHED IN JOURNAL OF THE IRON  
AND STEEL INSTITUTE V205 P426-7 APR 1967.

DESCRIPTORS: (\*IRON ALLOYS, \*TRANSFORMATIONS),  
(\*COBALT ALLOYS, \*TEMPERATURE), COOLING,  
ALLOYS, CARBON, RODS, MEASUREMENT, ACCURACY,  
NICKEL, MANGANESE, CHROMIUM, ANNEALING,  
THERMAL ANALYSIS, SAMPLING, THERMOCOUPLES,  
QUENCHING(COOLING), WELDING, TABLES

(U)

VALUES OF MS IN FE-CO ALLOYS CONTAINING  
BETWEEN 0.1 AND 24% CO SHOW A MINIMUM OF  
(ABOUT) 600C AT 18CO. EXTRAPOLATION OF  
MS VALUES FOR THE DILUTE ALLOYS SUGGESTS AN MS IN  
PURE IRON OF 740C. THESE ALLOYS ALSO SHOW A  
SIMILARITY TO FE-NI ALLOYS IN THE APPEARANCE OF  
TWO CONSTANT TEMPERATURE PLATEAUX IN THE GRAPHS OF  
TRANSFORMATION TEMPERATURE V. COOLING RATE.  
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-653 088 20/12 20/3  
CALIFORNIA UNIV SAN DIEGO LA JOLLA DEPT OF PHYSICS

SUPERCONDUCTING TRANSITIONS IN BODY-CENTERED CUBIC  
THALLIUM-INDIUM ALLOYS. (U)

JUN 66 4P LUE, H. L. IWILLENS, R. H.

CONTRACT: AF-AFOSR-631-64  
PROJ: AF-9763  
TASK: 976302  
MONITOR: AFOSR 67-1237

UNCLASSIFIED REPORT

AVAILABILITY: PUBLISHED IN PHYSICAL REVIEW V154  
N2 P436-B FEB 10 1967.

SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH  
CALIFORNIA INST. OF TECH., PASADENA, W. M.  
KECK LABS.

DESCRIPTORS: (\*SUPERCONDUCTORS, TRANSITION  
TEMPERATURE), (\*THALLIUM ALLOYS,  
SUPERCONDUCTIVITY), (\*INDIUM ALLOYS,  
SUPERCONDUCTIVITY), CRYSTAL STRUCTURE, CRYSTAL  
LATTICES, PHASE STUDIES, THERMAL EXPANSION,  
QUENCHING(COOLING), ANNEALING (U)

THE SUPERCONDUCTING TRANSITION TEMPERATURE AND THE  
LATTICE PARAMETER OF THE BODY-CENTERED CUBIC PHASE IN  
THE IN-TL SYSTEM ARE REPORTED. THE TRANSITION  
TEMPERATURE OF BCC-TL IS EXTRAPOLATED TO BE 3.0  
PLUS OR MINUS 0.1K. THE LINEAR THERMAL-EXPANSION  
COEFFICIENT OF THE BCC ALLOYS IS COMPUTED TO BE  
0.0000029/DEG.K BETWEEN 77 AND 300 K INDEPENDENT  
OF COMPOSITION. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMCI

AD-653 304 7/4 20/2 11/6  
CALIFORNIA UNIV SAN DIEGO LA JOLLA DEPT OF PHYSICS

LATTICE PARAMETERS OF IRON-RICH IRON-GALLIUM ALLOYS,  
(U)

SEP 66 4P LUO, H. L. I  
CONTRACT: AF-AFOSR-631-64  
PROJ: AF-9763  
TASK: 976302  
MONITOR: AFOSR 67-1224

UNCLASSIFIED REPORT

AVAILABILITY: PUBLISHED IN TRANSACTIONS OF THE  
METALLURGICAL SOCIETY OF AIME V239 P119-20 JAN  
1967.

DESCRIPTORS: (\*CRYSTAL LATTICES, \*IRON ALLOYS),  
(\*GALLIUM ALLOYS, CRYSTAL LATTICES), SOLUBILITY,  
CRYSTAL STRUCTURE, SOLID SOLUTIONS,  
QUENCHING(COOLING), X-RAY DIFFRACTION ANALYSIS,  
INTENSITY, HIGH-TEMPERATURE RESEARCH, BISMUTH,  
CESIUM COMPOUNDS, CHLORIDES, ATOMIC PROPERTIES,  
HEAT-RESISTANT METALS + ALLOYS, PHASE STUDIES,  
COBALT, FERROMAGNETIC MATERIALS, TESTS (U)

SYSTEMATIC INVESTIGATIONS OF THE FE-GA SYSTEM  
HAVE BEEN REPORTED ONLY RECENTLY. THE MAXIMUM  
SOLID SOLUBILITY OF GALLIUM IN ALPHA-FE IS NEARLY  
50 AT. PCT. AT 900C. HOWEVER, IT WAS NOT EVIDENT  
THAT THE ALPHA-FE SOLID SOLUTION COULD BE RETAINED  
SUCCESSFULLY BEYOND 17.38 AT. PCT GA BY SOLID-STATE  
QUENCHING. THE PRESENT INVESTIGATION REPORTS THE  
RETENTION OF ALPHA-FE SOLID SOLUTION AT 50 AT. PCT  
GA BY QUENCHING FROM THE LIQUID. AN ORDERED  
PHASE OF CSCL-TYPE (B2) STRUCTURE WAS  
OBSERVED BETWEEN 34 DIFFERENCE 50 AT. PCT GA.  
SINCE IT WAS CONSIDERED VERY PROBABLE THAT THE  
CSCL STRUCTURE WOULD OCCUR AT HIGH TEMPERATURES,  
ALLOY FILINGS WERE ALSO QUENCHED BY THE CONVENTIONAL  
QUENCHING TECHNIQUE. IN ADDITION TO THE CSCL  
PHASE, A SECOND ORDERED PHASE OF BIF3-TYPE  
(DO3) STRUCTURE WAS FOUND IN THE RANGE 25  
DIFFERENCE 30 AT. PCT GA. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-656 051 11/6  
FRANKLIN INST RESEARCH LABS PHILADELPHIA PA

A STUDY OF ALLOYING THEORY USING METASTABLE  
STRUCTURES.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 1 JUN 66-1 JUN 67,  
JUN 67 73P STOERING, ROLF ; CONRAD, HANS ;  
REPT. NO. F-C1869  
CONTRACT: N00014-66-C-0231  
PROJ: NR-039-314

UNCLASSIFIED REPORT

DESCRIPTORS: (\*COPPER ALLOYS, PHASE STUDIES),  
ZINC ALLOYS, SILVER ALLOYS,  
QUENCHING (COOLING), DIFFRACTION ANALYSIS,  
ELECTRON MICROSCOPY, HEAT TREATMENT,  
DECOMPOSITION, CHEMICAL PRECIPITATION, PHASE  
DIAGRAMS, ANNEALING, METALLURGY

(U)

THE PHASES AND STRUCTURES OF LIQUID QUENCHED AND  
VAPOR QUENCHED CU-AG ALLOYS AND LIQUID QUENCHED  
CU-ZN ALLOYS WERE INVESTIGATED BY X-RAY AND  
ELECTRON DIFFRACTION AND BY ELECTRON TRANSMISSION  
MICROSCOPY. FOR THE CU-AG ALLOYS A SINGLE  
PHASE FCC RANDOM SOLID SOLUTION WITH A MAXIMUM  
DEVIATION OF ABOUT +1% FROM VEGARD'S LAW WAS  
ONLY OBTAINED FOR THE THINNEST REGIONS (1000-3000  
A) WITH A SUBSTRATE TEMPERATURE OF -150 C. FOR  
THE THICKER REGIONS AND FOR HIGHER SUBSTRATE  
TEMPERATURES, SEGREGATED SILVER-RICH FCC PHASES  
DESIGNATED GAMMA DOUBLE PRIME AND ALPHA PRIME WERE  
OBTAINED. THE COPPER-RICH BETA PRIME PHASE WAS  
ONLY OBSERVED FOR THE HIGHEST SUBSTRATE TEMPERATURE  
OF 50 C. A NEW HEXAGONAL PHASE TERMED DELTA WAS  
FOUND IN VERY SLIGHT AMOUNTS IN THE LIQUID QUENCHED  
CU-AG ALLOYS. FOR THE CU-ZN ALLOYS, THE  
SOLUBILITY OF ZINC IN THE ALPHA PHASE WAS INCREASED  
TO 48% BY LIQUID QUENCHING. ANNEALING OF LIQUID  
QUENCHED CU50AG50 ALLOYS INDICATED THE FOLLOWING  
SEQUENCE FOR THE DECOMPOSITION OF THE METASTABLE  
PHASES: GAMMA PRIME (RANDOM) TO GAMMA DOUBLE  
PRIME (SPINODAL) TO ALPHA PRIME (SPINODAL) TO  
ALPHA PRIME + BETA PRIME TO ALPHA + BETA  
(EQUILIB.). (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-656 117 9/1 11/3  
DU PONT DE NEMOURS (E I) AND CO WILMINGTON DEL PLASTICS  
DEPT

TOUGHER WIRE JACKETS OF NYLON, (U)

63 7P BONNER, R. M. IKJELLMARK, E.  
W. , JR. ISHAW, R. E. :

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PREPARED FOR PRESENTATION AT  
SYMPOSIUM (12TH) ASBURY PARK, N. J., 4-6 DEC  
1963.

DESCRIPTORS: (ELECTRIC WIRE, NYLON COATINGS),  
TOUGHNESS, EXTRUSION, QUENCHING(COOLING),  
TEMPERATURE (U)

STUDIES OF VARIOUS 610 NYLON RESINS SHOW THAT THE  
TOUGHNESS OF WIRE JACKETS FABRICATED FROM THESE  
MATERIALS CAN BE IMPROVED CONSIDERABLY BY INCREASING  
THE TEMPERATURE OF THE SURFACE UPON WHICH THE NYLON  
IS EXTRUDED AND THE TEMPERATURE OF THE QUENCH WATER.  
AT THE SAME TIME, WE DO NOT BELIEVE THAT THIS  
FACTOR, ALONE, IS ANY PANACEA THAT WILL GUARANTEE  
PERFECT QUALITY WIRE; CERTAINLY MANY OTHER PROCESS  
FACTORS PLAY AN EQUALLY IMPORTANT PART IN PRODUCING A  
TOUGH NYLON JACKET. BASED ON OUR FINDINGS, WE  
WOULD ENCOURAGE THE MANUFACTURERS OF NYLON JACKETED  
WIRE TO EXPERIMENT WITH THE HEATED WIRE AND/OR HOT  
WATER QUENCH TO SEE IF IT RESULTS IN A TOUGHER NYLON  
JACKET FOR THEIR PARTICULAR CONSTRUCTION.  
(AUTHOR) (U)



UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZONC1

AD-666 872 20/2

ILLINOIS UNIV URBANA MATERIALS RESEARCH LAB

VACANCY ANNEALING IN THREE DIFFERENT EXPERIMENTS IN GOLD.

(U)

DESCRIPTIVE NOTE: REVISED ED.,

OCT 67 6P SHARMA, R. K. ILEE, C. I

KOEHLER, J. S. I

CONTRACT: DA-31-124-ARO(D)-65, AT(11-1)1198

PROJ: DA-20014501B32D

MONITOR: AROD 3369:4

UNCLASSIFIED REPORT

AVAILABILITY: PUBLISHED IN PHYSICAL REVIEW LETTERS, V19 N24 P1379-81 11 DEC 67.

SUPPLEMENTARY NOTE: REVISION OF REPORT DATED 14 AUG 67.

DESCRIPTORS: (CRYSTAL LATTICE DEFECTS, TRANSPORT PROPERTIES), GOLD, ANNEALING, CRYOGENICS, ELECTRON BOMBARDMENT, QUENCHING(COOLING), DEFORMATION, TENSILE PROPERTIES

(U)

IF THE CONCEPT OF LATTICE VACANCIES IS TO BE USEFUL, THEN ONE SHOULD BE ABLE TO IDENTIFY LATTICE-VACANCY MIGRATION IN DIFFERENT EXPERIMENTS IN WHICH OTHER DEFECTS HAVE ALSO BEEN INTRODUCED. TO DATE, SUCH A DEMONSTRATION HAS NOT BEEN GIVEN FOR ANY METAL. THE PRESENT NOTE REPORTS BRIEFLY THE RESULTS OF EXPERIMENTS IN WHICH VACANCIES WERE INTRODUCED INTO VERY PURE GOLD BY QUENCHING, BY 3-MEV ELECTRON IRRADIATION AT 100K, AND BY A FEW PERCENT TENSILE DEFORMATION AT 4.2K. ONE OBSERVES IN ALL CASES A PROMINENT ANNEALING PROCESS WHICH OCCURS IN THE RANGE FROM 20 TO 80C (FOR THE CONCENTRATIONS USED HERE) WITH AN ACTIVATION ENERGY IN THE PUREST SPECIMENS OF 0.90 PLUS OR MINUS 0.06 EV. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-667 238 20/2 11/6  
HARVARD UNIV CAMBRIDGE MASS DIV OF ENGINEERING AND  
APPLIED PHYSICS

ON THE INTERACTION BETWEEN POINT DEFECTS AND  
INCLUSIONS IN CRYSTALS.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
JAN 68 29P ASHBY, M. F. ;  
REPT. NO. TR-548  
CONTRACT: N00014-67-A-0298  
PROJ: NR-031-503

UNCLASSIFIED REPORT

DESCRIPTORS: (\*CRYSTAL LATTICE DEFECTS,  
INTERACTIONS), (\*METALS, CRYSTAL LATTICE  
DEFECTS), FREE ENERGY, ELASTICITY, STRESSES,  
STRAIN(MECHANICS), INTERFACES,  
QUENCHING(COOLING), DIFFUSION

(U)

WHEN A CRYSTAL CONTAINING INCOHERENT INCLUSIONS IS  
QUENCHED, THE VACANCY CONCENTRATION IN IT CAN  
APPROACH ITS NEW EQUILIBRIUM VALUE IF VACANCIES ENTER  
THE INCLUSION - MATRIX INTERFACE. THE LOSS OF  
VACANCIES LOWERS THE FREE ENERGY OF THE MATRIX, BUT  
IT GENERATES MISFIT AT THE INCLUSION WHICH IS  
ASSOCIATED WITH AN INCREASING ELASTIC STRAIN-ENERGY.  
EQUILIBRIUM IS TEMPORARILY RE-ESTABLISHED WHEN A  
VACANCY LEAVING THE MATRIX AND ENTERING THE INTERFACE  
LOWERS THE CHEMICAL FREE ENERGY OF THE MATRIX AND  
INCREASES THE STRAIN ENERGY BY EQUAL AMOUNTS. THIS  
EQUILIBRIUM IS TEMPORARY ONLY, SINCE, GIVEN TIME, THE  
VACANCIES ULTIMATELY DRAIN TO THE FREE SURFACE, THE  
VACANCY CONCENTRATION FALLS TO ITS TRUE EQUILIBRIUM  
VALUE, AND THE ELASTIC STRAIN DISAPPEARS AGAIN.  
THIS REPORT CALCULATES THE MAGNITUDE OF THE ELASTIC  
STRAINS WHICH FORM AT INCLUSIONS DUE TO THIS EFFECT.  
THEY CAN BE LARGE; MUCH LARGER THAN THOSE DUE TO  
DIFFERENCE IN COEFFICIENT OF THERMAL EXPANSION. IF  
THE STRAINS ARE LARGE ENOUGH, PRISMATIC PUNCHING WILL  
OCCUR AT THE INCLUSIONS TO RELIEVE THEM.  
INCLUSIONS THUS PROVIDE A MECHANISM FOR CONDENSING  
VACANCIES INTO PRISMATIC LOOPS WITHOUT THE USUAL  
NUCLEATION STEP. THE ACTUAL NUMBER OF VACANCIES  
WHICH CAN BE ACCEPTED BY AN INCLUSION IS LARGE, IN  
SPITE OF THE STRAINS WHICH FORM; THIS MEANS THAT A  
VOLUME FRACTION OF, SAY, 1% OF INCLUSIONS CAN ACT  
AN AN EFFICIENT SINK FOR VACANCIES.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZONC1

AD-668 606 11/6  
CLARKSON COLL OF TECHNOLOGY POTSDAM N Y DEPT OF  
PHYSICS

EFFECT OF HEAT TREATMENT ON THE RESISTIVITY OF BETA-  
BRASS, (U)

APR 68 2P HARKCOM, J. K. ; MARTIN, M.  
C. I  
CONTRACT: AF-AFOSR-794-65  
PROJ: AF-9763  
TASK: 976301  
MONITOR: AFOSR 68-0806

UNCLASSIFIED REPORT  
AVAILABILITY: PUBLISHED IN JOURNAL OF APPLIED  
PHYSICS, V39 N1 P339-40 1968.

DESCRIPTORS: (\*BRASS, RESISTANCE(ELECTRICAL)),  
HEAT TREATMENT, SINGLE CRYSTALS,  
AGING(MATERIALS), QUENCHING(COOLING) (U)

THE CHANGE IN ELECTRICAL RESISTIVITY AS A FUNCTION  
OF QUENCH TEMPERATURE WAS DETERMINED FOR A BETA-BRASS  
SINGLE CRYSTAL FOR THE RANGE OF TEMPERATURES 120-  
540C. THE AS-QUENCHED CURVES SHOW TWO  
RESISTIVITY PEAKS WHICH CAN BE IDENTIFIED AS THOSE  
OBSERVED BY BROWN, AND BY CLARK AND BROWN.  
THE HEIGHT OF THE PEAK AT 200C OBTAINED IN THIS  
EXPERIMENT IS SOMEWHAT LESS THAN HALF THE HEIGHT OF  
THE ONE OBSERVED BY CLARK AND BROWN IN RELATION  
TO THE MAXIMUM AT 470C. THE CURVE SHOWING THE  
RESISTIVITY AFTER AGING IS ESSENTIALLY THE SAME AS  
THE RESULTS OF MARTIN. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-673 407 11/6  
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

METASTABLE PHASES IN ALLOYS OF TITANIUM, THE  
MECHANISM AND KINETICS OF THEIR FORMATION  
(METASTABILNYE FAZY V SPLAVAKH TITANA, MEKHANIZM I  
KINETIKA IKH OBRAZOVANIYA), (U)

OCT 67 50P FEDOTOV, S. G. I  
REPT. NO. FTD-MT-24-194-67

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED MACHINE TRANS. OF MONO.  
ISSLEDOVANIYA METALLOV V ZHIKON I TVERDOM  
SOSTOYANIYAKH (INVESTIGATION OF METALS IN THE LIQUID  
AND SOLID STATES) MOSCOW, 1964 P207-240.

DESCRIPTORS: (\*TITANIUM ALLOYS, USSR), PHASE  
STUDIES, MODULUS OF ELASTICITY,  
QUENCHING(COOLING), VANADIUM ALLOYS,  
MOLYBDENUM ALLOYS, NIOBIUM ALLOYS, STABILITY,  
MARTENSITE, ANNEALING, DISLOCATIONS, CHROMIUM  
ALLOYS, MANGANESE ALLOYS, ZIRCONIUM ALLOYS,  
KINETIC ENERGY (U)  
IDENTIFIERS: TRANSLATIONS (U)

A SHORT REVIEW IS GIVEN WITH 56 REFERENCES FOLLOWED  
BY THE AUTHOR'S EXPTS. FOR DETG. YOUNG'S AND SHEAR  
MODULI, AS WELL AS POISSON COEFFS. IN QUENCHED AND  
ANNEALED ALLOYS OF THE FOLLOWING SYSTEMS: TI-  
MO, TI-V, TI-NB, TI-MO-V, TI-V-  
NB, AND TI-MO-V-NB. ELASTIC PROPERTIES  
OF ALPHA-TI ARE TWICE THOSE OF BETA-TI. WITH  
ANNEALED SPECIMENS THE ALLOYING INGREDIENTS LOWERED  
ELASTIC PROPERTIES OF ALPHA-TI, THE MORE LOWERED  
WERE THE ELASTIC PROPERTIES OF THE RESP. ALLOYS; THE  
ALLOYING ELEMENTS CAN BE PUT IN THE FOLLOWING ORDER  
OF DECREASING EFFECT ON THE ELASTIC PROPERTIES OF  
TI ALLOYS: MO-V-NB. WITH QUENCHED  
SPECIMENS AND ALPHA-TI OR ALPHA + BETA TI, THE  
ALLOYING INGREDIENTS LOWERED INITIALLY THE ELASTIC  
PROPERTIES SHARPLY AND AFTERWARDS RESTORED THEIR  
LEVEL JUMPWISE OR EVEN INCREASED THE LEVEL TO A NEW  
MAX. VALUE. AFTERWARDS THERE WAS AGAIN A DROP,  
FOLLOWED BY A SLOW INCREASE. ONE-PHASE BETA-TI  
ALLOYS DID NOT SHOW ANY DIFFERENCE IN BEHAVIOR OF  
ANNEALED AND QUENCHED SPECIMENS. MECHANISMS AND  
KINETICS OF MARTENSITIC BETA - ALPHA TRANSFORMATION  
IS DISCUSSED AND DESCRIBED AS TAKING PLACE IN 2  
STAGES: (1) SPONTANEOUS DISLOCATION OF SEP. TI  
ATOMS INTO A NEW MECH.

83

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(U)

/ZOHCI

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-677 557 13/8  
GENERAL DYNAMICS/CONVAIR SAN DIEGO CALIF

EVALUATION OF METHODS TO REDUCE HAND STRAIGHTENING  
OF QUENCHED ALUMINUM PARTS. (U)

DESCRIPTIVE NOTE: FINAL REPT.,  
JUL 61 12P MATTEK, L. J. IBARTOLORUI,  
G. D. I  
REPT. NO. GDC-PR-349

UNCLASSIFIED REPORT

DESCRIPTORS: (\*ALUMINUM ALLOYS, COOLING),  
MECHANICAL WORKING, AGING(MATERIALS),  
QUENCHING(COOLING), SHEETS, DUCTILITY,  
HARDNESS, TIME (U)  
IDENTIFIERS: ALUMINUM ALLOY 2024, ALUMINUM ALLOY  
7075, ALUMINUM ALLOY 7178 (U)

TWO METHODS OF REDUCING HAND STRAIGHTENING TIME OF  
HEAT TREATED SHEET ALUMINUM PARTS WERE EVALUATED.  
NO REDUCTION OF DISTORTION OCCURRED BY QUENCHING  
ALUMINUM PARTS IN WATER 'DISPERSED' BY A DOUBLE  
SCREEN FLOOR IN A STANDARD QUENCH RACK. AN  
INCREASE IN DUCTILITY AND SUBSEQUENT REDUCTION IN  
HAND STRAIGHTENING TIME RESULTED BY REDUCING THE  
NATURAL AGING TIME OF QUENCHED PARTS. THIS WAS  
ACCOMPLISHED BY A RAPID POST-QUENCH COOLING CYCLE AND  
A REDUCED HANDLING DELAY INVOLVED IN TRANSFERRING  
QUENCHED MATERIAL TO THE REFRIGERATORS.  
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-677 839 11/6 13/8  
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

QUENCHABLE EFFECTS OF HIGH PRESSURES AND  
TEMPERATURES ON THE CUBIC MONOXIDE OF TITANIUM. (U)

DESCRIPTIVE NOTE: JOURNAL ARTICLE,  
JUL 68 14P BANUS, MARIO D. I  
REPT. NO. JA-3303  
CONTRACT: AF 19(628)-5167  
MONITOR: ESD TR-68-323

UNCLASSIFIED REPORT  
AVAILABILITY: PUB. IN MATERIALS RESEARCH  
BULLETIN, V3 N9 P723-734 1968.

DESCRIPTORS: (•TITANIUM COMPOUNDS,  
QUENCHING(COOLING)), MONOXIDES, HIGH-PRESSURE  
RESEARCH, HIGH-TEMPERATURE RESEARCH, CRYOGENICS,  
CRYSTAL LATTICE DEFECTS, DENSITY, TRANSPORT  
PROPERTIES, TRANSITION TEMPERATURE,  
SUPERCONDUCTIVITY, RESISTANCE(ELECTRICAL) (U)  
IDENTIFIERS: TITANIUM MONOXIDES (U)

CHANGES IN LATTICE PARAMETER, DENSITY, NUMBER OF  
VACANCIES AND SEVERAL TRANSPORT PROPERTIES OF CUBIC  
TiO SUB X, WHERE  $0.85 < OR = X < OR = 1.25$ ,  
RESULT FROM QUENCHING UNDER PRESSURES OF 50-60 KBAR  
FROM ANNEALING TEMPERATURES OF 1100-1800C. THE  
SUPERCONDUCTING TRANSITION TEMPERATURE (T SUB C)  
INCREASES LINEARLY WITH OXYGEN CONTENT TO A MAXIMUM  
OF 2.0K AT X = 1.24 WHEN APPROXIMATELY 18% OF THE  
VACANCIES BECOME FILLED DURING THE PRESSURE  
TREATMENT. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZONCI

AD-678 367 11/6 7/4  
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

INFLUENCE OF IRON ON PHASE COMPOSITION,  
STRUCTURE, AND PROPERTIES OF A HEAT RESISTANT  
NICKEL-CHROMIUM-TUNGSTEN ALLOY,

(U)

OCT 67 11P BAIKOVA, T. P. ILASHKO, N.  
F. ISOROKINA, K. P. I  
REPT. NO. FTD-HT-23-1062-67

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED TRANS. OF MONO. FAZOVYI  
SOSTAV, STRUKTURA I SVOISTVA LEGIROVANNYKH STALEI  
I SPLAVOV (PHASE COMPOSITION, STRUCTURE, AND  
PROPERTIES OF ALLOYED STEELS AND ALLOYS),  
MOSCOW, 1965 P55-62, BY R. WALLACE.

DESCRIPTORS: (HEAT-RESISTANT METALS + ALLOYS,  
NICKEL ALLOYS), (NICKEL ALLOYS, PHASE  
STUDIES), DISPERSION HARDENING, MICROSTRUCTURE,  
INTERMETALLIC COMPOUNDS, CARBIDES, IRON ALLOYS,  
CHROMIUM ALLOYS, TUNGSTEN ALLOYS, HEAT TREATMENT,  
QUENCHING(COOLING), SOLID SOLUTIONS,  
AGING(MATERIALS), USSR

(U)

THE ALLOY E1868 WAS HEATED TO 1200C FOR 5 MIN.  
AND THEN COOLED IN WATER OR AIR. ALLOY E1868  
HARDENED DURING AGING OWING TO THE FORMATION OF THE  
DISPERSED PHASES: CARBIDES M<sub>23</sub>C<sub>6</sub>, SOLID SOLNS.  
OF TUNGSTEN IN CHROMIUM, OR INTERMETALLIC PHASE  
FE<sub>2</sub>W. IN ALLOYS CONTG. FE GREATER THAN OR  
EQUAL TO 20% THE ALPHA PHASE WAS FORMED.  
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-678 931 11/6 20/11  
CLARKSON COLL OF TECHNOLOGY POTSDAM N Y DEPT OF  
PHYSICS

HEAT TREATMENT EFFECTS ON SOME PHYSICAL PROPERTIES  
OF METALLIC SINGLE CRYSTALS.

(U)

DESCRIPTIVE NOTE: FINAL SCIENTIFIC REPT.,  
JUL 68 19P MARTIN, MARTIN C. ;  
CONTRACT: AF-AFOSR-794-65  
PROJ: AF-9763  
TASK: 976301  
MONITOR: AFOSR 68-1718

UNCLASSIFIED REPORT

DESCRIPTORS: (\*BRASS, PHASE STUDIES), (\*PHASE  
STUDIES, X-RAY DIFFRACTION ANALYSIS), COPPER,  
ZINC, CRYSTAL GROWTH, GRAIN  
STRUCTURES(METALLURGY), QUENCHING(COOLING),  
DIFFUSION, CRYSTAL LATTICES, POWDER METALS,  
RESISTANCE(ELECTRICAL), LIFE EXPECTANCY  
IDENTIFIERS: BINARY ALLOYS, ORDERED LATTICE,  
DISORDERED LATTICE

(U)

(U)

RESULTS ON THE EFFECT OF PLASTIC DEFORMATION ON THE  
ELECTRICAL RESISTIVITY OF HIGH PURITY POLYCRYSTALLINE  
COPPER, ALUMINUM AND NICKEL SHOWED THE CHANGE IN  
ELECTRICAL RESISTIVITY WITH PLASTIC STRAIN WAS NOT  
AFFECTED BY STRAIN RATE OVER THE RANGE INVESTIGATED.  
EXTENDED WORK ON NICKEL SHOWED THAT STAGES 2 AND 3  
OF PLASTIC DEFORMATION WERE WELL DEFINED FOR THAT  
METAL. THE RESULTS OF THE EFFECT OF QUENCHING ON  
THE ELECTRICAL RESISTIVITY OF BETA-BRASS SHOWED TWO  
RESISTIVITY PEAKS FOR RESISTIVITY MEASUREMENTS MADE 3  
MINUTES AFTER QUENCHING AND ONE RESISTIVITY PEAK FOR  
RESISTIVITY MEASUREMENTS MADE APPROXIMATELY 18 HOURS  
AFTER QUENCHING IN THE RELATIVE CHANGE IN RESISTIVITY  
VERSUS QUENCH TEMPERATURE GRAPHS. RESULTS ON X-  
RAY ANALYSIS OF BETA-BRASS AFTER QUENCHING PROVIDED  
NO EVIDENCE FOR THE FORMATION OF ANTIPHASE DOMAINS OR  
THAT A LARGE AMOUNT OF DISORDER CAN BE QUENCHED IN.  
THERE WAS SOME EVIDENCE THAT STACKING FAULTS MIGHT  
BE FORMED IN THE CRYSTAL BY THE QUENCHING PROCESS.  
(AUTHOR)

(U)



UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-682 219 11/6  
CARNEGIE-MELLON UNIV PITTSBURGH PA DEPT OF METALLURGY AND  
MATERIALS SCIENCE

THE EFFECT OF PRIOR-AUSTENITE GRAIN-SIZE ON THE  
STRESS-CORROSION CRACKING SUSCEPTIBILITY OF  
A.I.S.I. 4340 STEEL.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,  
JAN 69 40P PROCTER, R. P. M. IPAXTON,  
H. W. I  
CONTRACT: NONR-76D(31), ARPA ORDER-878

UNCLASSIFIED REPORT

DESCRIPTORS: (\*STEEL, STRESS CORROSION),  
(\*STRESS CORROSION, CRACK PROPAGATION),  
AUSTENITE, HEAT TREATMENT, QUENCHING(COOLING),  
DUCTILE BRITTLE TRANSITIONS, FRACTOGRAPHY,  
HYDROGEN EMBRITTLEMENT, GRAIN SIZE, YIELD POINT,  
TENSILE PROPERTIES, RECRYSTALLIZATION  
IDENTIFIERS: STEEL 4340

(U)

(U)

USING BOTH CONVENTIONAL HEAT-TREATMENTS AND  
REPEATED RAPID AUSTENITISING AND QUENCHING HEAT-  
TREATMENTS, A SERIES OF AISI 4340 STEELS WITH  
PRIOR-AUSTENITE GRAIN-SIZES COVERING THE RANGE ASTM  
7-12 WERE DEVELOPED. THE STRESS-CORROSION CRACKING  
SUSCEPTIBILITY OF THE STEELS IN A 3.5% AQUEOUS  
SOLUTION OF NaCl WAS INVESTIGATED USING FATIGUE-  
PRECRACKED, PLANE-STRAIN CANTILEVER-BEAM SPECIMENS.  
THE RESULTS OF AN ELECTRON FRACTOGRAPHIC  
INVESTIGATION OF THE STRESS-CORROSION FRACTURE  
SURFACES ARE DESCRIBED; THE EXPERIMENTAL RESULTS ARE  
INTERPRETED IN TERMS OF A HYDROGEN-EMBRITTLEMENT  
MECHANISM OF SLOW CRACK GROWTH. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMCI

AD-682 776 11/6  
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

SOME STRUCTURAL PECULIARITIES AND DISTINCTIVE  
PROPERTIES OF CAST TITANIUM ALLOYS, (U)

MAR 68 12P BOCHVAR, G. A. ICHISTYAKOV,  
E. P. I  
REPT. NO. FTD-HT-23-1487-67

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED TRANS. OF ISSLEDOVANIE  
SPRAYOV TSVETNYKH METALLOV (USSR) V4 N4 P249-256  
1963.

DESCRIPTORS: (TITANIUM ALLOYS, PHASE STUDIES),  
QUENCHING (COOLING), TRANSPORT PROPERTIES,  
RECRYSTALLIZATION, PLASTICITY, USSR (U)  
IDENTIFIERS: TRANSLATIONS (U)

THE LEVEL OF THE MECHANICAL PROPERTIES OF THE  
SINGLE-PHASED ALPHA AND DOUBLE-PHASED ALPHA-BETA  
TITANIUM ALLOYS IN THE CAST STATE DEPENDS NOT ONLY ON  
THE ADDITION, BUT ON THE CONDITION OF CRYSTALLIZATION  
AND PHASE RECRYSTALLIZATION; THE LATTER SHOWS A  
SIGNIFICANTLY GREATER EFFECT THAN THE PROCESS OF  
CRYSTALLIZATION. THE STABILITY OF ALPHA AND ALPHA-  
BETA TITANIUM ALLOYS IN THE CAST STATE DETERMINES THE  
COOLING RATE OF THE BETA REGION. HOWEVER, THE RATE  
OF COOLING DOES NOT INFLUENCE THE PLASTICITY OF THE  
SINGLE-PHASED ALPHA ALLOYS. THE EFFECT OF  
CRYSTALLIZATION ON THE MECHANICAL PROPERTIES OF  
TITANIUM ALLOYS IN THE CAST STATE INCREASES WITH  
INCREASING AMOUNT OF ALLOY COMPONENT. THE MICRO-  
STRUCTURES OF ALPHA AND ALPHA-BETA TITANIUM ALLOYS IN  
CAST STATE ARE CHARACTERIZED BY A PLASTIC FORMATION.  
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-683 905 7/4 11/2  
CHICAGO UNIV ILL JAMES FRANCK INST

NUCLEAR MAGNETIC RESONANCE IN THALLIUM BORATE  
GLASSES. I. THE THALLIUM-205 CHEMICAL SHIFT,

(U)

FEB 68 11P HOMII, ROBERT K. INACHTRIED,  
NORMAN H. I  
CONTRACT: AF-AFOSR-1087-66, SD-89  
PROJ: AF-9763  
TASK: 976302  
MONITOR: AFOSR 69-0520TR

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN JNL. OF PHYSICAL  
CHEMISTRY, V72 N10 P3416-3423 OCT 68.

DESCRIPTORS: (\*GLASS, \*NUCLEAR MAGNETIC  
RESONANCE), MELTING, OXYGEN, PARAMAGNETIC  
MATERIALS, QUENCHING(COOLING), THALLIUM  
COMPOUNDS, BORATES, OXIDES

(U)

IDENTIFIERS: \*THALLIUM-205 CHEMICAL SHIFT,  
THALLIUM(I) OXIDE, \*THALLIUM BORATE GLASS,  
BORATE GLASS

(U)

CHEMICAL SHIFT MEASUREMENTS ON 205TL IN THALLIUM  
BORATE GLASSES AT TEMPERATURES UP TO AND ABOVE THE  
SOFTENING TEMPERATURE (300C) INDICATE THAT THE  
INTERACTIONS OF TL(I) WITH OXYGEN ATOMS IN THE  
BORATE NETWORK ARE PREDOMINANTLY IONIC. THERE IS  
RELATIVELY LITTLE EFFECT OF COMPOSITION ON THE  
CHEMICAL SHIFT UP TO 18 MOL % TL2O, BUT ABOVE  
THIS CONCENTRATION THE 205TL RESONANCE SHIFTS  
SHARPLY DOWNFIELD. FOR ALL GLASS COMPOSITIONS UP  
TO 27 MOL % TL2O THE TEMPERATURE DEPENDENCE OF  
THE CHEMICAL SHIFT IS LINEAR AND DOWNFIELD. IT IS  
ATTRIBUTED TO AN INDUCED PARAMAGNETIC SUSCEPTIBILITY  
CAUSED BY THE THERMAL VIBRATIONAL OVERLAP OF CATION  
AND ANION WAVE FUNCTIONS. THE MODE OF PREPARATION  
OF THE GLASSES, IN PARTICULAR THE RATE OF COOLING  
FROM THE MELT AND THE TEMPERATURE FROM WHICH THE  
QUENCH IS MADE, AFFECTS THE 205TL CHEMICAL SHIFT.  
RAPID QUENCHES FROM HIGH TEMPERATURES CAUSE THE  
205TL RESONANCE TO SHIFT TO HIGHER FIELDS. THE  
SYMMETRY OF TL(+) SITES INCREASES WITH INCREASING  
MELT TEMPERATURE AND QUENCH RATE. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-684 497 11/6 13/8  
CARNEGIE-MELLON UNIV PITTSBURGH PA DEPT OF METALLURGY AND  
MATERIALS SCIENCE

GRAIN BOUNDARY SEGREGATION OF IMPURITIES IN METALS  
AND INTERGRANULAR BRITTLE FRACTURE. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
MAR 69 37P LOW, JOHN R. , JR.; GOODMAN,  
STEPHEN R. ; SMITH, CRAIG L. ;  
REPT. NO: CMU-031-727-1  
CONTRACT: N00014-67-A-0314  
PROJ: NR-031-727

UNCLASSIFIED REPORT

DESCRIPTORS: (\*STEEL, HEAT TREATMENT), GRAIN  
BOUNDARIES, DUCTILE BRITTLE TRANSITION, IMPACT  
TESTS, PHOSPHORUS ALLOYS, ANTIMONY ALLOYS,  
ETCHING, NEUTRON ACTIVATION, CHEMICAL ANALYSIS (U)

THE REPORT DISCUSSES TWO INVESTIGATIONS OF TEMPER  
EMBRITTLEMENT IN LOW ALLOY QUENCHED AND TEMPERED  
STEEL. PART I DEALS WITH ADDITIVE EFFECTS OF  
PHOSPHORUS AND ANTIMONY AS EMBRITTLING IMPURITIES IN  
THIS TYPE OF GRAIN-BOUNDARY EMBRITTLEMENT. PART  
II DESCRIBES EFFORTS TO DEVELOP A METHOD OF  
DETERMINING THE DEGREE OF SEGREGATION OF ALLOYS AND  
IMPURITIES TO GRAIN-BOUNDARIES DURING TEMPER  
EMBRITTLEMENT. THE METHOD UNDER STUDY INVOLVES  
NEUTRON ACTIVATION ANALYSIS OF THE ETCHANT FROM  
ETCHED INTERGRANULAR FRACTURE SURFACES.  
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-685 836 11/6 20/11 13/8  
ARMY MATERIALS AND MECHANICS RESEARCH CENTER WATERTOWN  
MASS

FRACTURE SURFACE TOPOGRAPHY AND TOUGHNESS OF 4340  
STEEL. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
FEB 69 19P CARR, FRANK L. LARSON,  
FRANK R. I  
REPT. NO. AMMRC-TR-69-03  
PROJ: DA-1-T-062105-A-328

UNCLASSIFIED REPORT

DESCRIPTORS: (\*STEEL, FRACTOGRAPHY), HEAT  
TREATMENT, TENSILE PROPERTIES, NOTCH TOUGHNESS,  
IMPACT TESTS, FRACTURE(MECHANICS),  
QUENCHING(COOLING), SURFACE ROUGHNESS, VISUAL  
INSPECTION, DUCTILE BRITTLE TRANSITION (U)  
IDENTIFIERS: STEEL 4340 (U)

AISI 4340 STEEL WAS HEAT TREATED TO EIGHT STRENGTH  
LEVELS BY TEMPERING GROUPS OF SPECIMENS AT INTERVALS  
OF 100 F BETWEEN 500 F AND 1200 F. TENSION,  
NOTCH TENSION, AND CHARPY V-NOTCH IMPACT  
SPECIMENS WERE MACHINED FROM THESE MATERIALS AND  
TESTED OVER A RANGE OF TEMPERATURES BETWEEN THAT OF  
LIQUID NITROGEN AND 400 F. THE FRACTURE OF EACH  
SPECIMEN WAS EXAMINED AT LOW MAGNIFICATION AND EACH  
ZONE OF FRACTURE SURFACE CONFIGURATION WAS MEASURED.  
WHEN PLOTTED AS A FUNCTION OF TESTING TEMPERATURE,  
THESE MEASUREMENTS RESULTED IN TRANSITIONAL CURVES  
FOR ALL THREE TYPES OF SPECIMENS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-685 880 19/4 13/8 20/11  
UNITED STATES STEEL CORP MONROEVILLE PA APPLIED RESEARCH  
LAB

UNIDIRECTIONALLY SOLIDIFIED WROUGHT STEEL  
ARMOR.

(U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT. 1 JUL 67-29  
OCT 68,

APR 69 101P BIENIOSEK, C. E. ISKIDMORE,  
K. F. PORTER, L. F. ;  
CONTRACT: DAAG46-67-C-0158  
PROJ: DA-1-F-141812-D-154  
MONITOR: AMMRC CR-69-01(F)

UNCLASSIFIED REPORT

DESCRIPTORS: (\*ARMOR PLATE, CASTING),  
(\*CASTINGS, MECHANICAL PROPERTIES), STEEL,  
QUENCHING(COOLING), LIQUID METALS, HARDNESS,  
CRACK PROPAGATION, DENDRITIC STRUCTURE, SHEAR  
STRESSES, IMPACT TESTS, TENSILE PROPERTIES,  
DUCTILITY, HEAT TREATMENT, GRAIN  
STRUCTURES(METALLURGY), SEPARATION  
IDENTIFIERS: SOLIDIFICATION, \*COLUMNAR STRUCTURE,  
\*UNIDIRECTIONAL SOLIDIFICATION, INGOTS,  
HOMOGENIZING

(U)

(U)

CAST STEELS, WITH SUPERIOR DUCTILITY, CAN BE  
PRODUCED BY UNIDIRECTIONAL SOLIDIFICATION, WHICH  
RESULTS IN MINIMUM MACROSEGREGATION AND MACROPOROSITY  
AND LESS MICROPOROSITY THAN IS FOUND IN CONVENTIONAL  
CASTINGS. TO PRODUCE A SUPERIOR WROUGHT STEEL  
ARMOR, TECHNIQUES WERE ESTABLISHED FOR CASTING  
UNIDIRECTIONALLY SOLIDIFIED SLABS 10 BY 16 BY 5-1/2  
INCHES WEIGHING ABOUT 240 POUNDS. THE SLABS WERE  
HOMOGENIZED BY HOLDING IN EVACUATED STAINLESS-STEEL  
BOXES FOR 64 HOURS AT 2400 F, AND ROLLED TO PLATES  
FOR BALLISTIC TESTING. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZONC1

AD-687 077 11/6  
NAVAL RESEARCH LAB WASHINGTON D C

CORROSION-FATIGUE CRACK PROPAGATION STUDIES OF  
SOME NEW HIGH-STRENGTH STRUCTURAL STEELS. (U)

DESCRIPTIVE NOTE: INTERIM REPT.,  
APR 69 18P CROCKER, T. W. ILANCE, E.  
A. I

REPT. NO. NRL-6870

PROJ: SF-51-541-003-12383, RR-007-01-46-5432

UNCLASSIFIED REPORT

DESCRIPTORS: (\*STEEL, CRACK PROPAGATION), HEAT  
TREATMENT, STRESS CORROSION, FATIGUE(MECHANICS),  
STRESSES, LOADING(MECHANICS), LIFE EXPECTANCY,  
TENSILE PROPERTIES, IMPACT TESTS, ENVIRONMENTAL  
TESTS, PLASTICITY, NICKEL ALLOYS, COBALT ALLOYS,  
CHROMIUM ALLOYS, MOLYBDENUM ALLOYS (U)  
IDENTIFIERS: STEEL 4CO 9NI, STEEL 8CO 2CR  
MO 10NI, STEEL 13CR 2MO 8NI (U)

FATIGUE CRACK PROPAGATION STUDIES WERE CONDUCTED ON  
THREE NEW HIGH-STRENGTH STRUCTURAL STEELS: 9NI-  
4CO-0.20C, QUENCHED AND TEMPERED; 10NI-2CR-  
1MO-8CO, DUAL STRENGTHENED; AND 13CR-8NI-  
2MO, PRECIPITATION-HARDENED STAINLESS. THE YIELD  
STRENGTHS OF THESE STEELS RANGED FROM 176 TO 193 KSI.  
NOTCHED CANTILEVER-BEND SPECIMENS OF EACH STEEL  
WERE CYCLED ZERO-TO-TENSION IN TWO ENVIRONMENTS -  
ROOM AIR AND 3.5% NaCl SALT WATER. FATIGUE  
CRACK GROWTH RATES WERE MEASURED EXPERIMENTALLY AND  
CORRELATED WITH THE CRACK TIP STRESS-INTENSITY FACTOR  
RANGE. THE RESULTS INDICATE THAT THESE NEW STEELS  
POSSESS GREATER RESISTANCE TO FATIGUE CRACK  
PROPAGATION AND LESS SENSITIVITY TO ENVIRONMENT THAN  
PREVIOUSLY STUDIED STEELS OF COMPARABLE STRENGTH.  
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-687 663 11/6  
DEFENCE STANDARDS LABS MARIBYRNONG (AUSTRALIA)

IMPROVED TECHNIQUES FOR DETERMINING TRANSFORMATION  
TEMPERATURES DURING SIMULATED WELDING CONDITIONS. (U)

DEC 67 6P PHILLIPS, R. H. I

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN BRITISH WELDING JNL.  
P547-552 NOV 68. NO COPIES FURNISHED.

DESCRIPTORS: (\*STEEL, PHASE STUDIES), (\*WELDING,  
PHASE STUDIES), WELDS, TRANSFORMATIONS,  
AUSTENITE, MARTENSITE, LIFE EXPECTANCY, HEAT  
TREATMENT, QUENCHING(COOLING), DIFFERENTIAL  
THERMAL ANALYSIS, BAINITE, AUSTRALIA (U)

IDENTIFIERS: PHASE TRANSFORMATIONS, TIME  
TEMPERATURE TRANSITION CURVES (U)

A STUDY HAS BEEN MADE OF THE ERRORS OCCURRING IN  
THE DETERMINATION OF TRANSFORMATION TEMPERATURES IN  
LOW HARDENABILITY STEEL SPECIMENS THERMALLY CYCLED TO  
SIMULATE WELDING CONDITIONS. THERMAL GRADIENTS IN  
THE RAPIDLY COOLING SAMPLE WERE A SOURCE OF ERROR IN  
THE DILATOMETRIC METHOD. SOME WAYS OF REDUCING THE  
ERRORS ARE DISCUSSED. THE TRANSFORMATION  
TEMPERATURES DETERMINED BY DILATOMETRY ARE COMPARED  
WITH THOSE OBTAINED BY THERMAL ANALYSIS.  
(AUTHOR) (U)



UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-687 738 11/6  
DREXEL INST OF TECH PHILADELPHIA PA DEPT OF METALLURGICAL  
ENGINEERING

SPHEROIDIZATION OF BINARY IRON-CARBON ALLOYS OVER  
A RANGE OF TEMPERATURES. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
APR 69 38P HECKEL, RICHARD W. IVEDULA,  
KRISHNA M. I  
REPT. NO. TR-1  
CONTRACT: N00014-67-A-0406  
TASK: NR-031-714

UNCLASSIFIED REPORT

DESCRIPTORS: (\*STEEL, HEAT TREATMENT), PHASE  
STUDIES, IRON ALLOYS, CARBON ALLOYS,  
MICROSTRUCTURE, METALLOGRAPHY, AUSTENITE,  
MARTENSITE, DIFFUSION, STATISTICAL ANALYSIS,  
QUENCHING(COOLING), FERRITES, CARBIDES,  
SPHERES (U)  
IDENTIFIERS: \*AUSTENITIZING, CEMENTITE,  
\*SPHEROIDIZING, OSTWALD RIPENING, BINARY ALLOYS (U)

THE SPHEROIDIZATION OF CEMENTITE IN BINARY IRON-  
CARBON ALLOYS WAS INVESTIGATED OVER A RANGE OF  
TEMPERATURES (594, 649, AND 704C) FOR TIMES UP TO  
ABOUT A MILLION SECONDS. QUANTITATIVE  
METALLOGRAPHY TECHNIQUES WERE USED TO OBTAIN THE  
FOLLOWING MICROSTRUCTURAL DATA ON THE CEMENTITE  
PARTICLES: SHAPE, SIZE DISTRIBUTION, MEAN SIZE,  
NUMBER OF PARTICLES PER UNIT VOLUMES, AND GROWTH  
(AND SHRINKAGE) RATES OF VARIOUS SIZES IN THE  
SIZE DISTRIBUTION. THE VARIATIONS OF THESE  
MICROSTRUCTURAL PARAMETERS WERE ANALYZED IN TERMS OF  
EXISTING MODELS FOR THE SPHEROIDIZATION PROCESS.  
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-688 142 11/6 20/2  
HARVARD UNIV CAMBRIDGE MASS DIV OF ENGINEERING AND  
APPLIED PHYSICS

FORMATION, STABILITY AND STRUCTURE OF PALLADIUM-  
SILICON BASED ALLOY GLASSES.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
FEB 69 42P CHEN, H. S. TURNBULL, D. I  
REPT. NO. TR-19  
CONTRACT: N00014-67-A-0298  
PROJ: NR-032-485

UNCLASSIFIED REPORT

DESCRIPTORS: (\*PALLADIUM ALLOYS, PHASE STUDIES),  
(\*SILICON ALLOYS, SOLID SOLUTIONS), GLASS,  
QUENCHING(COOLING), RESISTANCE(ELECTRICAL),  
RHEOLOGY, CRYSTALLOGRAPHY, X-RAY DIFFRACTION  
ANALYSIS, MICROSTRUCTURE, TRANSITION TEMPERATURE,  
ELECTRON MICROSCOPY

(U)

IDENTIFIERS: TERNARY SYSTEMS, BINARY ALLOYS,  
\*SPLAT COOLING, AMORPHOUS MATERIALS

(U)

A SERIES OF PD-SI BASED ALLOY GLASSES WERE  
FORMED BY QUENCHING MELTS TO ROOM TEMPERATURE AT  
VARIOUS COOLING RATES. CERTAIN TERNARY ALLOYS OF  
PD-AU-SI, PD-AG-SI AND PD-CU-SI  
FORMED GLASSES WITH THICKNESSES GREATER AND 1 MM AT  
COOLING RATES AS LOW AS 100C/SEC. THE GLASS-  
LIQUID TRANSITION WAS EXHIBITED THERMALLY BY BOTH  
BINARY AND TERNARY ALLOYS. THE RHEOLOGICAL  
MANIFESTATIONS OF THE GLASS TRANSITION WAS OBSERVED  
QUALITATIVELY FOR CERTAIN OF THE TERNARY ALLOYS.  
THE ELECTRICAL RESISTIVITY OF THE ALLOYS IN THEIR  
VARIOUS STATES WERE ALSO MEASURED.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-688 721 11/6 20/2  
FRANKLIN INST RESEARCH LABS PHILADELPHIA PA

NON-EQUILIBRIUM EFFECT STRUCTURES PRODUCED BY  
DRASTIC QUENCHING FROM THE LIQUID STATE.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 10 JUN 65-9 JUN 68,  
MAR 69 75P MEAKIN, J. D. ;  
REPT. NO. F-B2362  
CONTRACT: DA-31-124-ARO(D)-368  
PROJ: DA-2-0-014501-8-32-D  
MONITOR: AROD 5409:2-MC

UNCLASSIFIED REPORT

DESCRIPTORS: (\*METALS, CRYSTAL STRUCTURES),  
(\*CRYSTAL STRUCTURE, QUENCHING(COOLING)),  
ANTIMONY, SILICON, TITANIUM, IRON, ALUMINUM  
ALLOYS, INDIUM ALLOYS, X-RAY DIFFRACTION ANALYSIS,  
PHOTOMICROGRAPHY, SOLID SOLUTIONS  
IDENTIFIERS: \*SPLAT COOLING

(U)

(U)

THE DEVELOPMENT OF HIGH SPEED QUENCHING BY THE  
SPLAT COOLING TECHNIQUE WAS FOLLOWED BY WORK ON  
METASTABLE SYSTEMS. STUDIES WERE CONDUCTED ALONG  
LINES SIMILAR TO TRADITIONAL PHASE DIAGRAM RESEARCH  
BUT USING INTENTIONALLY METASTABLE SPECIMENS. THE  
PRIMARY AIM OF THIS RESEARCH WAS THE DEDUCTION OF  
STRUCTURAL INFORMATION ON THE LIQUID STATE BY  
EXAMINING AMORPHOUS MATERIAL PRODUCED BY SPLAT  
COOLING. THIS REPORT DESCRIBES AND SEEKS TO  
INTERPRET THE STRUCTURE PRODUCED IN PURE METALS BY  
THE SPLAT COOLING TECHNIQUE. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-691 529 20/2  
NORTHWESTERN UNIV EVANSTON ILL DEPT OF MATERIALS  
SCIENCE

THE DEFECT STRUCTURE OF IRON OXIDE, (U)

FEB 68 16P KOCH, F. ICHEN, J. B. I  
CONTRACT: AF-AFOSR-327-63  
PROJ: AF-9763  
TASK: 976301  
MONITOR: AFOSR 69-1887TR

UNCLASSIFIED REPORT  
AVAILABILITY: PUB. IN ACTA CRYSTALLOGRAPHICA,  
VB25 PT2 P275-287 FEB 69.

DESCRIPTORS: (\*IRON OXIDES, \*CRYSTAL LATTICE  
DEFECTS), SINGLE CRYSTALS, QUENCHING(COOLING),  
X-RAY DIFFRACTION ANALYSIS (U)  
IDENTIFIERS: WUSTITE (U)

THE SUPERSTRUCTURE PEAKS FIRST REPORTED BY MANENC  
IN QUENCHED SPECIMENS OF  $Fe(1-x)O$  HAVE BEEN  
STUDIED IN DETAIL, WITH A SINGLE CRYSTAL OF  
 $FeO_{0.9020}$ . THESE PEAKS WERE FOUND TO BE DUE TO  
PERIODICALLY SPACED CLUSTERS OF VACANCIES, EACH  
CLUSTER OF NEIGHBORING OCTAHEDRAL CATION SITES BEING  
GROUPED ABOUT OCCUPIED TETRAHEDRAL CATION SITES.

THE CLUSTERS DO NOT APPEAR TO BE REGIONS OF  
MAGNETITE. STRUCTURE FACTOR CALCULATIONS, BASED ON  
A MODEL WHERE EACH CLUSTER CONSISTED OF 13 VACANCIES  
AND 4 TETRAHEDRAL IONS, GIVE SUBSTANTIAL AGREEMENT  
WITH THE OBSERVED INTENSITIES. SMALL DISPLACEMENTS  
TOWARDS THIS CLUSTER ARE FOUND FOR THE SURROUNDING  
CATIONS WHILE DISPLACEMENTS IN THE OPPOSITE SENSE ARE  
FOUND FOR ANIONS. THE BASIC CLUSTER PERSISTS AT  
TEMPERATURES IN THE ONE PHASE FIELD, UP TO AT LEAST  
1150C AND TO A VALUE OF  $x = 0.082$ , ALTHOUGH THE  
LONG-RANGE PERIODICITY OF THE CLUSTERS IS DESTROYED.  
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZONC1

AD-691 798 13/8 11/6  
BOEING CO PHILADELPHIA PA VERTOL DIV

TENSILE PROPERTIES OF TI 7AL-4MO HEAVY-  
SECTION FORGINGS,

(U)

JAN 69 28P RAEFSKY, M. I  
REPT. NO. DB-2161-1

UNCLASSIFIED REPORT

DESCRIPTORS: (\*TITANIUM ALLOYS, TENSILE  
PROPERTIES), (\*FORGING, TITANIUM ALLOYS),  
ALUMINUM ALLOYS, MOLYBDENUM ALLOYS, HEAT  
TREATMENT, AGING(MATERIALS)

(U)

IDENTIFIERS: TITANIUM ALLOY 7AL 4 MO,  
FORGINGS

(U)

IN GENERAL, BETA FORGING TI 7AL-4MO RESULTS  
IN LOWER TENSILE PROPERTIES, ESPECIALLY REDUCTION IN  
AREA. THE BEST COMBINATION OF ANNEALED PROPERTIES  
OCCURS ON MILL ANNEALING FOLLOWED BY A SINGLE HIGH  
(1700F) TEMPERATURE ANNEAL. THE BEST  
COMBINATION OF SOLUTION TREATED PROPERTIES RESULTS  
FROM LOW TEMPERATURE FORGING, FOLLOWED BY QUENCHING  
FROM 1720F. YIELD STRENGTH CAN BE INCREASED BY  
QUENCHING FROM HIGHER TEMPERATURES. OVER AGING AT  
1250F RESULTS IN A DECREASE IN TENSILE AND YIELD  
STRENGTHS, WITH A CORRESPONDING INCREASE IN  
DUCTILITY. SOLUTION HEAT TREAT TEMPERATURES FOR  
ALPHA/BETA FORGED MATERIAL SHOULD NOT EXCEED 1720F.  
TI 7AL-MO, IN GENERAL, IS CAPABLE OF HIGHER  
SOLUTION TREATED AND AGED STRENGTHS THAN TI 6AL-  
4V. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-693 455 11/6 13/8 20/11  
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

CHANGE IN THE STRUCTURE OF A FRACTURE AND THE IMPACT  
STRENGTH OF 3X13H7C2 STEEL AS A RESULT OF  
OVERHEATING IN HOT WORKING UNDER PRESSURE AND HEAT  
TREATMENT, (U)

JAN 69 9P KONOROVICH, I. E. ITAMARINA,  
A. M. ;  
REPT. NO. FTD-HT-23-859-68

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED TRANS. OF IZVESTIYA  
VYSSHIKH UCHEBNYKH ZAVEDENII. CHERNAYA  
METALLURGIYA (USSR) V10 N6 P113-116 1967.

DESCRIPTORS: (STEEL, HOT WORKING), HEAT  
TREATMENT, FRACTURE (MECHANICS), MATERIAL  
FORMING, AUSTENITE, DISPERSION HARDENING, GRAIN  
STRUCTURES (METALLURGY), CRACKS, CRACK  
PROPAGATION, USSR (U)

IDENTIFIERS: STEEL 3X13H7C2 (USSR),  
TRANSLATIONS (U)

BRITTLE FRACTURE WITH A CRYSTALLINE APPEARANCE MAY  
DEVELOP IN STEEL OWING TO THE PRESENCE OF PEARLITE  
AND BAINITE IN THE MICROSTRUCTURE OR OWING TO THE  
DEVELOPMENT OF TEMPER BRITTLENESS AND OVER HEATING  
DURING HOT WORKING AND HEAT TREATMENT. THE ARTICLE  
DEALS WITH CHANGES IN THE STRUCTURAL APPEARANCE OF  
FRACTURE OF 3X13H7C2 STEEL (0.28 PERCENT C,  
2.5 PERCENT SI, 0.55 PERCENT MN, 12.9 PERCENT  
CR, 6.95 PERCENT NI, 0.20 PERCENT S, 0.025  
PERCENT P) DUE TO OVERHEATING DURING DIE FORGING AT  
850, 950, 1050, 1150 AND 1200 DEGREES C (DEGREE  
OF DEFORMATION 40 PERCENT) AND HEAT TREATMENT  
(QUENCHING FROM 1050 DEGREES IN WATER (40 MIN)  
PLUS ANNEALING AT 870 DEGREES C (7 HR), COOLING  
WITH FURNACE PLUS NORMALIZING AT 670 DEGREES C  
(70 MIN), COOLING IN AIR PLUS QUENCHING FROM 850  
DEGREES C (40 MIN) IN OIL. FOLLOWING THIS  
TREATMENT SPECIMENS OF THE STEEL WERE SUBJECTED TO  
MECHANICAL TESTS AT ROOM TEMPERATURE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-693 524 11/6 13/8  
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

IMPACT THERMOMECHANICAL QUENCHING OF ALUMINUM  
ALLOYS.

(U)

JUL 69 10P ANDREEVA, O. I. ;  
REPT. NO. FTD-HT-23-319-68

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED TRANS. OF MONO.  
AKUSTICHESKAYA I MAGNITNAYA OBRABOTKA VESHCHESTV,  
NOVOCHERKASSK, 1966 P117-120, BY L. THOMPSON.

DESCRIPTORS: (•QUENCHING(COOLING), •ALUMINUM  
ALLOYS), MELTING, SHOCK(MECHANICS),  
VIBRATION, STRESSES, DEFORMATION, HARDNESS,  
USSR

(U)

IDENTIFIERS: IMPACT THERMOMECHANICAL QUENCHING,  
TRANSLATIONS

(U)

THE EFFECT OF HYDRAULIC SHOCK AND MECHANICAL  
VIBRATIONS IN THE PROCESS OF MELTING OF THE ALLOYS  
D1 AND V95 ON THEIR MECHANICAL PROPERTIES WAS  
INVESTIGATED. IT WAS ESTABLISHED THAT FOLLOWING  
THEIR IMPULSIVE THERMOMECHANICAL QUENCHING THE  
HARDNESS OF SPECIMENS OF THESE ALLOYS IS HIGHER THAN  
THAT OF CONTROL SPECIMENS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-693 849 11/6 13/8  
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

NOTCH SENSITIVITY AFTER VARIOUS METHODS OF  
THERMOMECHANICAL HARDENING OF STEEL, (U)

FEB 69 6P SHAKHNAZAROV, YU. V. I  
REPT. NO. FTD-HT-23-1057-68

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED TRANS. OF IZVESTIYA  
VYSSHIKH UCHEBNYKH ZAVEDENIY. CHERNAYA  
METALLURGIYA (USSR) VII N2 P115-117 1968, BY L.  
THOMPSON.

DESCRIPTORS: (STEEL, HARDENING), NOTCH  
SENSITIVITY, TENSILE PROPERTIES, HEAT TREATMENT,  
USSR (U)  
IDENTIFIERS: TRANSLATIONS (U)

MINIMUM SUSCEPTIBILITY TO PRESSURE CONCENTRATORS IS  
PROVIDED BY HIGH TEMPERATURE MECHANICAL TREATMENT.  
DURING TREATMENT AT EQUAL STRENGTH, THE  
SUSCEPTIBILITY TO PRESSURE CONCENTRATORS AFTER  
COMBINED THERMOMECHANICAL TREATMENT IS LOWER THAN  
AFTER LOW TEMPERATURE MECHANICAL TREATMENT.  
INTERMEDIATE HIGH TEMPERING WITH SUBSEQUENT  
HARDENING BY QUENCHING, IMPROVES MACHINABILITY BY  
MEANS OF CUTTING, AND DECREASES THE SUSCEPTIBILITY OF  
STEEL, SUBJECTED TO THERMOMECHANICAL TREATMENT TO  
CONCENTRATIONS OF PRESSURES. (AUTHOR) (U)



UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-695 891 11/6  
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

WORK HARDENING OF 26KH2NGSM STEEL DURING PLASTIC  
DEFORMATION IN THE HARDENED STATE, (U)

APR 69 15P ASHMARINA, G. I. IVASILEVA,  
A. G. I KELEKHAEV, V. YA. I PROKOSHKIN, D. A.

REPT. NO. FTD-MT-24-66-69

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED MACHINE TRANS. OF FIZIKA I  
KHIMIYA OBRABOTKI MATERIALOV (USSR) NS P80-85  
1968.

DESCRIPTORS: (\*MARTENSITE, MECHANICAL WORKING),  
STEEL, STRAIN HARDENING, DEFORMATION, TEMPERING,  
REDUCTION OF AREA, DISPERSION HARDENING, YIELD  
POINT, PLASTICITY, VISCOSITY, STRESS RELIEVING,  
USSR (U)

IDENTIFIERS: TRANSLATIONS, STRUCTURAL STEEL,  
WORK HARDENING (U)

THE WORK HARDENING OF 26KH2NGSM STEEL DURING  
DEFORMATION IN THE MARTENSITE STATE DEPENDING UPON  
THE DEGREE OF REDUCTION AND TEMPERING WAS  
INVESTIGATED. IT WAS SHOWN THAT THE EFFECT OF WORK  
HARDENING AND THE CHARACTER OF THE CHANGE IN  
PLASTICITY AND VISCOSITY DEPEND ON THE METHOD OF  
TREATMENT. THE HIGHEST COMPLEX OF PROPERTIES IS  
OBTAINED DURING TREATMENT BY THE METHOD OF QUENCHING-  
TEMPERING AT 200 DEGREES - 20 PERCENT REDUCTION.  
DEFORMATION OF MARTENSITE PROMOTES THE DECELERATION  
OF THE PROCESSES OF STRESS RELIEF DURING FINAL  
TEMPERING. THE HIGH VALUES OF THE YIELD POINT AND  
OF ULTIMATE STRENGTH ARE MAINTAINED DURING HEATING UP  
TO 400 DEGREES C. WITH TESTING DURING THE  
BIAXIAL STATE OF STRAIN IT WAS ALSO ESTABLISHED THAT  
TREATMENT BY THE 'MARFORMING' PROCESS IMPROVES THE  
PROPERTIES WHICH ARE CHARACTERIZED BY THE STRUCTURAL  
STRENGTH OF THE INVESTIGATED STEEL. ON THE BASES  
OF THE OBTAINED RESULTS PROPOSALS WERE FORMULATED ON  
THE POSSIBLE STRUCTURAL PROCESSES, ENTERING INTO THE  
FORMATION OF THE PROPERTIES OF STEEL DURING ITS  
DEFORMATION IN THE MARTENSITE STATE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-696 301 11/6 20/12  
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

STRUCTURE AND PROPERTIES OF THE KHN6OMVTYU  
(EP487) ALLOY,

(U)

SEP 69 12P ZIMINA, L. N. IKOSHELEVA, G.  
F. IKARDONOV, B. A. ITSVETKOVA, V. K. I  
REPT. NO. FTD-HT-23-449-68

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED TRANS. OF MONO. STRUKTURA I  
SVOISTVA ZHAROPROCHNYKH METALLICHESKIKH MATERIALOV  
(STRUCTURE AND PROPERTIES OF HEAT-RESISTANT  
METALLIC MATERIALS), MOSCOW 1967 P181-186, BY D.  
KOOLBECK.

DESCRIPTORS: (REFRACTORY METALS, NICKEL ALLOYS),  
(NICKEL ALLOYS, MECHANICAL PROPERTIES),  
DISPERSION HARDENING, AGING (MATERIALS),  
HARDNESS, MICROSTRUCTURE, HEAT TREATMENT,  
QUENCHING (COOLING), CREEP, ELONGATION,  
USSR

(U)

IDENTIFIERS: TRANSLATIONS, NICKEL ALLOY  
KHN6OMVTYU (USSR), NICKEL ALLOY EP-  
487 (USSR)

(U)

THE STRUCTURE AND PROPERTIES OF THE NEW  
KHN6OMTYU (EP487) HEAT-RESISTANT, WROUGHT  
NICKEL ALLOY (17-20 PERCENT CHROMIUM, 9-11 PERCENT  
MOLYBDENUM, 4-5 PERCENT TUNGSTEN, 2.2-2.8 PERCENT  
TITANIUM, 1.0-1.5 PERCENT ALUMINUM, NOT MORE THAN 6  
PERCENT IRON AND 0.08 PERCENT CARBON) HAS BEEN  
INVESTIGATED. THE ALLOY WAS DEVELOPED BY  
TSNIICM JOINTLY WITH OTHER INSTITUTIONS AND IS  
BEING USED FOR THE MANUFACTURE OF WELDED ARTICLES  
OPERATING AT 750-900 DEGREES CENTIGRADE. THE ALLOY  
ATTAINS ITS MAXIMUM STRENGTH AFTER AGING AT 800-850  
DEGREES CENTIGRADE. ITS HARDNESS INCREASES RAPIDLY  
DURING THE FIRST 2-3 HOURS AND THEN INCREASES  
INSIGNIFICANTLY WITH HOLDING TIME INCREASING UP TO 25  
HOURS. THE MICROSTRUCTURE OF THE ALLOY, AFTER  
AGING AT 800 DEGREES CENTIGRADE FOR 10 HOURS,  
CONSISTS OF A SOLID SOLUTION WITH PRECIPITATES OF THE  
STRENGTHENING GAMMA-PHASE AT GRAIN BOUNDARIES AND  
FAIRLY LARGE INCLUSIONS OF CARBIDE PHASES. THE  
OPTIMAL MECHANICAL PROPERTIES OF THE ALLOY ARE  
OBTAINED AFTER AIR-QUENCHING FROM 1100-1130 DEGREES  
CENTIGRADE AND AGING AT 850 DEGREES CENTIGRADE FOR 3  
HOURS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-696 503 11/6 20/12 13/8  
ILLINOIS INST OF TECH CHICAGO DEPT OF METALLURGICAL  
ENGINEERING

THE DEFORMATION OF MARTENSITE.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,  
SEP 69 6P BREYER, NORMAN N. I  
REPT. NO. IIT-55217-F  
CONTRACT: DA-31-124-AROD(D)-420  
MONITOR: AROD 5533:6

UNCLASSIFIED REPORT

DESCRIPTORS: (COLD WORKING, MARTENSITE),  
(MARTENSITE, DEFORMATION), PHYSICAL PROPERTIES,  
MECHANICAL PROPERTIES, TEMPERING, MICROSTRUCTURE,  
METALLOGRAPHY, DISLOCATIONS, CARBON,  
INTERACTIONS, STEEL, TEST METHODS  
IDENTIFIERS: STEEL 1018, STEEL 1035, STEEL 1045,  
STEEL 4340

(U)

(U)

THE CHANGES IN PHYSICAL AND MECHANICAL PROPERTIES  
INTRODUCED BY DEFORMING AS-QUENCHED MARTENSITE OF  
1018, 1035, 1045 AND 4340 STEEL WERE STUDIED DURING  
SUBSEQUENT TEMPERING USING SEVERAL TECHNIQUES.  
TEMPERING IN THE TEMPERATURE RANGE FROM 200 TO 500  
F REVEALED A RETARDATION OF TEMPERING. THE  
RESISTANCE TO TEMPERING WAS OBSERVED DURING USE OF  
HARDNESS, DILATION, COLOR CARBON AND ELECTRICAL  
RESISTIVITY TECHNIQUES. A MODEL EMPLOYING A CARBON  
ATOM-VACANCY INTERACTION WAS FOUND TO BE CONSISTENT  
WITH THE OBSERVED EFFECTS. (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-697 145 11/6  
CALIFORNIA UNIV LOS ANGELES SCHOOL OF ENGINEERING AND  
APPLIED SCIENCE

RELATION BETWEEN K SUB IC AND MICROSCOPIC STRENGTH  
FOR LOW ALLOY STEELS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
AUG 69 40P MALKIN, JOEL ITETELMAN, ALAN  
S. I  
REPT. NO. TR-1, UCLA-69-58  
CONTRACT: DAHCO4-68-C-0008  
MONITOR: AROD 8016:1-MC

UNCLASSIFIED REPORT

DESCRIPTORS: (\*STEEL, FRACTURE(MECHANICS)),  
ARMY RESEARCH, TRANSITION TEMPERATURE,  
BRITTLINESS, HARDENING (U)  
IDENTIFIERS: \*LOW ALLOY STEELS, IRRADIATION  
EMBRITTELEMENT (U)

A SIMPLE MODEL WAS DEVELOPED TO DETERMINE K SUB  
IC IN TERMS OF THE MICROSCOPIC CLEAVAGE STRENGTH  
AND THE TENSILE YIELD STRENGTH FOR LOW TEMPERATURE  
CLEAVAGE FRACTURE IN A302B AND A533 REACTOR  
GRADE QUENCHED AND TEMPERED STEELS. THE MODEL  
APPLIES AT SUFFICIENTLY LOW TEMPERATURES OR IN  
IRRADIATED STEELS WHERE MICROSCOPIC CLEAVAGE STRENGTH  
< OR = 3.4 TENSILE YIELD STRENGTH. IT WAS  
DETERMINED THAT MICROSCOPIC CLEAVAGE STRENGTH IS  
INDEPENDENT OF TEMPERATURE BELOW -150F AND THEN  
INCREASES WITH INCREASING TEMPERATURE. AT THIS  
TIME, IT APPEARS THAT MICROSCOPIC CLEAVAGE STRENGTH  
IS INDEPENDENT OF IRRADIATION. AT TEMPERATURES  
ABOVE THAT AT WHICH MICROSCOPIC CLEAVAGE STRENGTH <  
OR = 3.4 TENSILE YIELD STRENGTH, UNSTABLE FRACTURE  
INITIATES WHEN A CRITICAL PLASTIC STRAIN IS ACHIEVED  
NEAR TO THE CRACK TIP. THE CRITICAL LOCAL PLASTIC  
STRAIN FOR UNSTABLE FRACTURE ALSO INCREASES WITH  
INCREASING TEMPERATURE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-697 571 11/6  
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

HIGH STRENGTH ALLOYS OF THE TI-AL-MO-V  
SYSTEM,

(U)

MAR 69 10P GLAZUNOV, S. G. ICHINENOV,  
A. M. IKHOREV, A. I. IGRUZDEV, L. A. I  
MARTYNOV, M. M. I  
REPT. NO. FTD-MT-24-28-69  
PROJ: FTD-6010703

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED MACHINE TRANS. OF TSVETNYE  
METALLY (USSR) V41 N8 P91-92 1968.

DESCRIPTORS: (\*TITANIUM ALLOYS, MECHANICAL  
PROPERTIES), ALUMINUM ALLOYS, MOLYBDENUM ALLOYS,  
VANADIUM ALLOYS, HEAT TREATMENT, TENSILE  
PROPERTIES, PLASTICITY, USSR

(U)

IDENTIFIERS: TRANSLATIONS, \*TITANIUM ALLOY 2AL  
4MO 8V, \*TITANIUM ALLOY 2AL 5MO 6V

(U)

A STUDY WAS MADE OF SEVERAL TI-AL ALLOYS  
ALLOYED WITH ONE OR TWO BETA-STABILIZING ELEMENTS  
(MO AND V). THE ALLOYS WERE CAST INTO 6 KG  
INGOTS WHICH WERE FORGED INTO BARS 25 MM IN DIAMETER  
AND FINALLY ROLLED INTO SHEETS 1.5 MM THICK. TO  
INCREASE THE PLASTICITY OF THE SHEETS, THEY WERE  
ANNEALED AT 750 DEGREES C AND FURNACE COOLED.  
SPECIMENS CUT FROM THE SHEETS, WATER-QUENCHED FROM  
780 DEGREES C AND AGED AT 480-520 DEGREES C FOR 8  
HR WERE TENSILE TESTED. THE OPTIMAL COMBINATION OF  
MECHANICAL PROPERTIES WAS FOUND IN TI-4MO-8V-  
2AL-0.05ZR ALLOY (TENSILE STRENGTH 145 KG/MM  
(TO THE SECOND POWER), ELONGATION 9.5 PERCENT AND  
REDUCTION OF AREA 40 PERCENT) AND IN TI-5MO-  
6V-2AL-0.05ZR ALLOY (TENSILE STRENGTH 147 KG/  
(SQ MM), ELONGATION 7 PERCENT AND REDUCTION OF  
AREA 30 PERCENT). (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-697 6C3 11/6  
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

THE EFFECT OF ALLOYING AND HEAT TREATMENT ON THE  
STRENGTH AND CAVITATION RESISTANCE OF ALLOYS WITH  
AGE-HARDENABLE MARTENSITE, (U)

MAR 69 14P MALINOV, L. S. IMASLAKOV, T.  
M. ISTRIZHAK, V. A. 1  
REPT. NO. FTD-HT-23-1147-68  
PROJ: FTD-6040102

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED TRANS. OF  
ENERGOMASHINOSTROENIE (USSR) V13 N5 P29-32 1967, BY H.  
PECK.

DESCRIPTORS: (\*STEEL, \*CORROSION), (\*CAVITATION,  
CORROSION), MARAGING STEELS, DISPERSION  
HARDENING, MARTENSITE, NICKEL ALLOYS, COBALT  
ALLOYS, MOLYBDENUM ALLOYS, EROSION, HARDNESS,  
USSR (U)

IDENTIFIERS: \*CAVITATION CORROSION,  
TRANSLATIONS (U)

IN AN ATTEMPT TO FIND A CAVITATION-RESISTANT  
MATERIAL FOR HYDRAULIC TURBINES, TESTS WERE MADE OF  
SEVERAL LOW-CARBON MARAGING STEELS, N20, N20M2,  
N20K15, N20TYU, N20M3TYU AND  
N20K10M5TYU, CONTAINING 0.03 PERCENT CARBON,  
19.7-19.85 PERCENT NICKEL, 0-14.75 PERCENT COBALT,  
AND 0-4.85 PERCENT MOLYBDENUM. AFTER ANNEALING AND  
QUENCHING, ALL THE STEELS EXCEPT N20K10M5TYU  
HAS A MARTENSITE CONTENT OF 80-90 PERCENT. WATER-  
QUENCHED N20K10M5TYU STEEL CONTAINED 45  
PERCENT MARTENSITE AND AFTER REFRIGERATION IN LIQUID  
NITROGEN, 67 PERCENT. HOWEVER, AFTER AGING AT 400-  
500C THIS STEEL HAD THE HIGHEST HARDNESS, OWING TO  
THE COMBINED EFFECT OF COBALT, MOLYBDENUM, TITANIUM  
AND ALUMINUM. N20K10M5TYU STEEL ALSO HAD THE  
HIGHEST CAVITATION RESISTANCE. IN ANOTHER SERIES  
OF EXPERIMENTS, SEVERAL PRECIPITATION-HARDENABLE  
STEELS, SUCH AS OKH12N4TYU,  
OOKH14N6M2TYU, OOKH16N4MD2, AND  
1KH17N5TYU WERE TESTED. THESE STEELS, AFTER  
ANNEALING AND QUENCHING, CONTAINED 80-95 PERCENT  
MARTENSITE. AGING AT 450-600C RAISED THE STEEL  
HARDNESS TO 400--500 HB. IN THE ANNEALED AND  
AGED CONDITION THE STEELS HAD A CAVITATION RESISTANCE  
COMPARABLE TO THAT OF MARAGING STEELS.  
(AUTHOR)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZONCI

AD-699 419 19/4  
UNITED STATES STEEL CORP MONROEVILLE PA APPLIED RESEARCH  
LAB

IMPROVED PROCESSING PROCEDURES FOR HEAT-TREATABLE  
DUAL-HARDNESS STEEL ARMOR. (U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT. 4 SEP 68-4 SEP  
69.

DEC 69 91P MANGELLO, SAMUEL J. I  
CONTRACT: DAAG46-69-C-0003  
PROJ: ARL-39.018-026  
MONITOR: AMMRC CR-69-19

UNCLASSIFIED REPORT

DESCRIPTORS: (\*ARMOR, MANUFACTURING METHODS),  
(\*STEEL, ARMOR), HARDNESS, ARMOR PLATE, HEAT  
TREATMENT, CRACKS, CUTTING, CHEMICAL MILLING,  
SURFACE PROPERTIES, ENCAPSULATION,  
QUENCHING(COOLING) (U)  
IDENTIFIERS: DUAL HARDNESS ARMOR,  
DECARBURIZING (U)

BECAUSE OF VARIOUS PROCESSING DIFFICULTIES AND A  
HIGH REJECTION RATE ENCOUNTERED IN THE EARLY  
COMMERCIALIZATION OF HEAT-TREATABLE DUAL-HARDNESS  
STEEL ARMOR, EXTENSIVE STUDIES WERE MADE TO SOLVE  
THESE PROBLEMS. THE PROCESS-TECHNOLOGY STUDY  
DESCRIBES WORK CULMINATING IN THE MINIMIZATION OF  
DECARBURIZATION, ELIMINATION OF SURFACE GRINDING,  
CUTTING OF PLATES WITHOUT EDGE CRACKING, AND  
ELIMINATION OF QUENCH CRACKING. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-700 072 11/6  
BATTELLE MEMORIAL INST COLUMBUS OHIO COLUMBUS LABS

MECHANICAL-PROPERTY DATA 300M STEEL: QUENCH AND  
TEMPERED FORGING.

(U)

DEC 69 8P  
CONTRACT: F33615-69-C-1115  
PROJ: AF-7381  
TASK: 738106

UNCLASSIFIED REPORT

DESCRIPTORS: (\*STEEL, MECHANICAL PROPERTIES),  
FORGING, HEAT TREATMENT, DATA  
IDENTIFIERS: \*STEEL 300-M, HIGH STRENGTH STEELS,  
STRUCTURAL STEELS

(U)

(U)

THE MAJOR OBJECTIVES OF THE PROGRAM ARE TO EVALUATE  
NEWLY DEVELOPED STRUCTURAL MATERIALS OF POTENTIAL  
AIR FORCE WEAPONS-SYSTEM INTEREST AND THEN TO  
PROVIDE DATA-SHEET-TYPE PRESENTATIONS OF THESE  
DATA.

(U)



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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-700 391 11/6  
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

SHORT-DURATION AND STRESS-RUPTURE STRENGTH OF  
BETA-ALLOY OF TI-MO-CR-FE-AL SYSTEM AT  
HIGH TEMPERATURES,

(U)

OCT 69 15P AGEEV, N. V. IGLAZUNOV, S.  
G. PETROVA, L. A. TARASENKO, G. N. I  
GRANKOVA, L. P. I  
REPT. NO. FTD-MT-24-240-69  
PROJ: FTD-6010703

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED MACHINE TRANS. FROM AKADEMIYA  
NAUK SSSR. INSTITUT METALLURGII, MOSCOW. TRUDY,  
P294-300 1967.

DESCRIPTORS: (TITANIUM ALLOYS, HEAT-RESISTANT  
METALS + ALLOYS), MOLYBDENUM ALLOYS, CHROMIUM  
ALLOYS, IRON ALLOYS, ALUMINUM ALLOYS, THERMAL  
STABILITY, STRESSES, RUPTURE, CREEP,  
MICROSTRUCTURE, HEAT TREATMENT, USSR  
IDENTIFIERS: TRANSLATIONS, TITANIUM ALLOY 3AL  
5.5CR 3FE 7MO

(U)

(U)

A BETA-ALLOY OF TI CONTG. MO 7, CR 5.5, FE  
3, AND AL 3 PERCENT WHEN QUENCHED FROM 800 DEGREES  
AND AGED AT 550 OR 525 DEGREES FOR 15 HRS. AT 500  
DEGREES FOR 20 HRS., AND AT 450 DEGREES FOR 50 HRS.  
EXHIBITS HIGH MECH. PROPERTIES AT ELEVATED TEMPS.  
WHEN EXPOSED TO THE ANTICIPATED WORKING TEMP.  
(350 DEGREES) FOR 100, 500, AND 1000 HRS. ITS  
MECH. PROPERTIES ARE INFLUENCED SLIGHTLY, INDICATING  
HIGH THERMAL STABILITY. TO ACCOMPLISH THE HEAT-  
RESISTANCE TESTS, SPECIMENS 4 MM. IN DIAM. WERE  
SUBJECTED TO BENDING WITH THE APPLICATION OF  
CENTRIFUGAL FORCE THAT PERMITTED A SIMULTANEOUS DETN.  
OF CREEP RESISTANCE AND STRESS-RUPTURE STRENGTH.  
THE SAMPLES WERE TESTED AT 350 DEGREES IN THE AIR  
AND THE RATE OF CREEP WAS ASSESSED FROM BENDING  
INFLECTION. THE MICROSTRUCTURE OF STRAINED SAMPLES  
AFTER 250 HRS. TESTING DIFFERS SLIGHTLY FROM THAT OF  
INITIAL SPECIMENS AND THE ONLY CHANGE OBSERVABLE IS  
THE APPEARANCE OF SUBGRAIN BOUNDARIES IN PRIMARY  
BETA-GRAINS. SPECIMENS QUENCHED FROM 800 DEGREES  
AND AGED ACCORDING TO THE REGIME A OR B WERE  
TESTED AS TO HEAT RESISTANCE AT 20-700 DEGREES.  
FROM 250 TO 450 DEGREES THEIR MECH. STRENGTH VARIES  
SLIGHTLY. AT 500 DEGREES IT DECREASES BUT STILL  
MAINTAINS RELATIVELY HIGH VALUES.

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-700 626 11/6 13/8  
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

INVESTIGATION OF THE FORMATION OF TITANIUM ALUMINIDE  
Ti3Al FROM A SOLID SOLUTION BY THE MODULUS OF  
ELASTICITY METHOD, (U)

SEP 69 IIP KORNILOV, I. I. IFEDOTOV, S.  
G. INARTOV, T. T. I  
REPT. NO. FTD-MT-24-218-69  
PROJ: FTD-6010703

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED MACHINE TRANS. OF MONO.  
DIFFUZIONNYYE PROTSESSY V METALLAKH (DIFFUSION  
PROCESSES IN METALS), N.P., 1968 P110-113.

DESCRIPTORS: (\*TITANIUM ALLOYS, \*HEAT TREATMENT),  
ALUMINUM ALLOYS, INTERMETALLIC COMPOUNDS,  
ELASTICITY, USSR (U)  
IDENTIFIERS: TITANIUM INTERMETALLICS,  
TRANSLATIONS (U)

THE EFFECT OF HEAT TREATMENT OF Ti-AL ALLOYS OF  
CONSTITUTION NEAR TO THAT OF Ti3Al AND CONTG.  
15.9 AND 16.6 PERCENT AL BY WT. ON THEIR MECH.  
PROPERTIES WERE STUDIED. THE MODULUS OF ELASTICITY  
E AND THE MODULUS OF TRANSVERSE ELASTICITY G WERE  
DETD. BY THE RESONANCE METHOD. THE SPECIMENS WERE  
ANNEALED AT 600 DEGREES FOR 200 HRS., THEN WERE  
HEATED IN SEALED QUARTZ AMPULS AT 800, 900, 1000,  
1100, 1150, 1200, AND 1300 DEGREES FOR 48, 24, 18, 3,  
2, 1, AND 0.4 HRS., RESP., AND QUENCHED IN WATER.  
THE RESULTS OBTAINED SHOW THE CONTINUOUS DECREASE  
OF E AND G, AS THE QUENCHING TEMPS. INCREASE IN  
THE RANGE OF 900-1100 DEGREES FOR 15.9 PERCENT AND  
900-1150 DEGREES FOR 16.6 PERCENT AL. FURTHER  
INCREASING OF THESE TEMPS. CAUSED INCREASE OF E AND  
G. AFTERWARDS THE SPECIMEN OF 15.9 PERCENT AL  
WAS QUENCHED FROM 1100 DEGREES AGAIN AND THE EFFECT  
OF THE DURATION OF ITS TEMPERING AT 600, 700, AND 800  
DEGREES ON THE PARAMETERS INVESTIGATED WAS STUDIED.  
G AND E INCREASE ONLY DURING THE 1ST 5-10 HRS. OF  
TEMPERING AT 600-700 DEGREES. FURTHER HOLDING OF  
ALLOY AT THESE TEMPS. DID NOT AFFECT THESE  
PARAMETERS. THE TEMPERING AT 800 DEGREES CAUSED  
INCREASE OF G AND E ONLY DURING THE 1ST 2 HRS.  
AND FURTHER HOLDING CAUSED DECREASE OF THESE  
PARAMETERS DOWN TO VALUES FOR AS-QUENCHED STATE. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-702 289 11/6 13/8  
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

INVESTIGATION OF WEAR RESISTANCE OF ALUMINUM ALLOYS  
V95, VAD23 AND D16, (U)

OCT 69 IIP KESTNER, O. E. ISPEKTOROVA,  
S. I. GERASIMOVA, I. I. KONDRASHINA, M. V.

1  
REPT. NO. FTD-MT-24-282-69  
PROJ: FTD-7230278

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED MACHINE TRANS. OF  
ALYUMINIEVYE SPLAVY (USSR) N5 P176-180 1968.

DESCRIPTORS: (ALUMINUM ALLOYS, WEAR RESISTANCE),  
(HEAT TREATMENT, ALUMINUM ALLOYS), FRICTION,  
ANODIC COATINGS, USSR  
IDENTIFIERS: TRANSLATIONS (U)  
(U)

IN SOME DOMAINS OF TECHNOLOGY IT HAS BECOME  
NECESSARY TO USE ALUMINUM ALLOYS AS THE MATERIALS OF  
PARTS OF GEAR AND FRICTION DRIVES (GEARINGS, CAMS,  
ETC.) WHICH MUST MEET HIGH REQUIREMENTS FOR WEAR  
RESISTANCE AND PRECISION DIMENSIONING. ANALYSIS  
SHOWS THAT THE MOST SUITABLE ALLOYS FOR THIS PURPOSE  
ARE THE ALLOYS V95, VAD23 AND D16 PROVIDED THAT  
THEY ARE SUBJECTED TO THE FOLLOWING REGIMES OF HEAT  
TREATMENT TO ASSURE SATISFACTORY DIMENSIONAL  
STABILITY AND MECHANICAL PROPERTIES: (A)  
V95, QUENCHING FROM 470 PLUS OR MINUS 5 DEGREES  
CENTIGRADE, COOLING IN 80 DEGREES CENTIGRADE WATER,  
AGING AT 140 PLUS OR MINUS 5 DEGREES CENTIGRADE FOR  
16 HR; (B) D16, QUENCHING FROM 500 PLUS OR  
MINUS 5 DEGREES CENTIGRADE, COOLING IN 80 DEGREES  
CENTIGRADE WATER, AGING AT 190 PLUS OR MINUS 5  
DEGREES CENTIGRADE FOR 12 HR; (C) VAD23,  
QUENCHING FROM 525 PLUS OR MINUS 5 DEGREES  
CENTIGRADE, COOLING IN 20 DEGREES CENTIGRADE WATER,  
AGING AT 190 PLUS OR MINUS 5 DEGREES CENTIGRADE FOR  
12 HR. ACCORDINGLY, FOLLOWING THIS HEAT TREATMENT,  
SPECIMENS OF THE ABOVE ALLOYS WERE SUBJECTED TO WEAR  
TESTS IN KH-2 AND AMSLER FRICTION MACHINES.  
THESE TESTS SHOWED THAT THE MAXIMUM WEAR RESISTANCE  
IS DISPLAYED BY THE ALLOY V95 WHEN HARDENED BY  
MEANS OF HEAT TREATMENT TO A BRINELL HARDNESS OF  
150-180 KG/SQ MM. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-702 912 1976 13/8 11/4  
WATERVLIET ARSENAL N Y

SOME OBSERVATIONS ON THE RELATIONSHIP BETWEEN  
MICROSTRUCTURE AND MECHANICAL PROPERTIES IN LARGE  
CYLINDRICAL GUN TUBE FORGINGS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
MAR 70 38P DEFRIES, RICHARD S. INOLAN,  
CHARLES J. BRASSARD, THERESA V. I  
REPT. NO. WVT-7018  
PROJ: DA-1-C-024401-A-110, DA-1-T-062105-A-328

UNCLASSIFIED REPORT

DESCRIPTORS: (GUN BARRELS, MECHANICAL  
PROPERTIES), MICROSTRUCTURE, FORGING,  
MARTENSITE, BAINITE, TENSILE PROPERTIES, HEAT  
TREATMENT, IMPACT TESTS, NOTCH TOUGHNESS (U)

A SERIES OF LABORATORY ISOTHERMAL AND CONTINUOUS  
COOLING HEAT-TREATMENTS WERE EMPLOYED TO DEVELOP AND  
CHARACTERIZE THE LOW TEMPERATURE TRANSFORMATION  
PRODUCTS OR MICROSTRUCTURES WHICH COULD BE PRESENT IN  
COMMERCIALY PRODUCED LARGE GUN TUBE FORGINGS. THE  
TENSILE MECHANICAL PROPERTIES, HARDNESS AND CHARPY  
V-NOTCH IMPACT TRANSITION CURVES WERE DETERMINED  
FOR EACH OF THE VARIOUS MICROSTRUCTURES PRODUCED.  
OF THE THREE MICROSTRUCTURES (MARTENSITE AND TWO  
BAINITES) EVALUATED, TEMPERED MARTENSITE PRODUCED  
THE BEST COMBINATION OF STRENGTH AND TOUGHNESS.  
CONTINUOUS COOLING HEAT TREATING STUDIES WERE USED  
TO DEMONSTRATE THAT A FULLY MARTENSITIC  
MICROSTRUCTURE COULD BE PRODUCED AT THE MID-RADIUS OF  
FULL SIZE LARGE GUN TUBE FORGINGS. LOW YIELD  
STRENGTHS AND IMPACT ENERGIES WERE CORRELATED WITH  
THE TEMPERED BAINITIC STRUCTURES PRODUCED BY  
TRANSFORMING OR QUENCHING THE GUN STEEL FORGINGS TOO  
SLOWLY. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-703 120 1976 11/6  
WATERVLIET ARSENAL N Y

VARIATION IN MECHANICAL PROPERTIES OF TEMPERED  
MARTENSITE GUN STEEL.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
MAR 70 22P BALDREY, DOUGLAS ILYONS,  
THOMAS I  
REPT. NO. WVT-7020  
PROJ: M1-8-23022

UNCLASSIFIED REPORT

DESCRIPTORS: (ORDNANCE STEEL, MECHANICAL  
PROPERTIES), (GUN BARRELS, ORDNANCE STEEL),  
HEAT TREATMENT, MARTENSITE, MICROSTRUCTURE

(U)

THE PURPOSE OF THE INVESTIGATION WAS TO DETERMINE  
THE LEVEL AND REPRODUCIBILITY OF MECHANICAL  
PROPERTIES IN THE PRESENT GUN TUBE MATERIALS,  
QUENCHED TO A UNIFORM MICROSTRUCTURE OF 100%  
MARTENSITE AND TEMPERED TO YIELD STRENGTH RANGES OF  
140-160,000 PSI AND 160-180,000 PSI. REHEAT  
TREATMENT OF SMALL SECTIONS OF GUN TUBE MATERIAL  
RESULTS IN A FINER, MORE UNIFORM MARTENSITIC  
STRUCTURE THAN EXISTED IN THE ORIGINAL TUBE. THESE  
RESULTS SHOULD REPRESENT THE MINIMUM VARIATION IN  
MECHANICAL PROPERTIES THAT CAN BE EXPECTED IN OUR  
PRESENT GUN TUBE MATERIAL. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMCI

AD-704 400 13/8 11/6  
DEFENSE DOCUMENTATION CENTER ALEXANDRIA VA

QUENCHING (COOLING). VOLUME 1. (U)

DESCRIPTIVE NOTE: REPORT BIBLIOGRAPHY JUN 61-SEP 69.  
APR 70 156P  
REPT. NO. DDC-TAS-70-28-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*QUENCHING(COOLING),  
\*BIBLIOGRAPHIES), HEAT TRANSFER, BERYLLIUM  
ALLOYS, NICKEL ALLOYS, ALUMINUM ALLOYS, TITANIUM  
ALLOYS, STEEL, REFRACTORY METALS, REFRACTORY METAL  
ALLOYS, GOLD ALLOYS, PALLADIUM ALLOYS, IRON,  
SUBMARINE HULLS, ROCKET CASES, GUN COMPONENTS,  
MACHINE TOOLS, WELDING, HEAT TREATMENT,  
MECHANICAL PROPERTIES (U)  
IDENTIFIERS: BINARY SYSTEMS(ALLOYS), TERNARY  
SYSTEMS(ALLOYS) (U)

THE REFERENCES IN THE BIBLIOGRAPHY DEAL WITH  
VARIOUS TECHNIQUES OF QUENCHING METALS AND ALLOYS TO  
OPTIMIZE THEIR PROPERTIES. TESTS OF THE TREATED  
MATERIALS ARE MADE IN THE PRODUCTION OF SUBMARINE  
HULLS, ROCKET CASES, GUN COMPONENTS AND MACHINE  
TOOLS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-705 920 11/6 13/8  
ILLINOIS INST OF TECH CHICAGO

INFLUENCE OF DEFORMATION ON THE TEMPERING OF 1045  
MARTENSITE,

(U)

JUL 69 14P MILLER, M. F. IBREYER, N.  
N. 1  
CONTRACT: DA-31-124-ARO(D)-420  
PROJ: DA-2-0-061102-B-32-D  
MONITOR: AROD 5533:3-MC

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN TRANSACTIONS OF THE ASM, V62  
P891-901 1969.

SUPPLEMENTARY NOTE: REVISION OF REPORT DATED 9 MAY  
69.

DESCRIPTORS: (\*MARTENSITE, TEMPERING),  
DEFORMATION, STEEL  
IDENTIFIERS: STEEL 1045

(U)

(U)

AS-QUENCHED MARTENSITIC 1045 STEEL BARS WERE  
PLASTICALLY DEFORMED BY DRAWING THROUGH A DIE.  
HARDNESS, DILATION, AND COLOR CARBON (EGGERTZ  
TEST) WERE USED TO FOLLOW THE CHANGES DURING  
TEMPERING TO 800 F AS A FUNCTION OF DEFORMATION.  
THE DEFORMED STEEL INCREASED IN DENSITY WITH  
DEFORMATION, AND THE PRECIPITATION OF CARBIDES WAS  
RETARDED UPON TEMPERING. THE CARBON-VACANCY  
ATTRACTION MODEL IS FOUND TO BE CONSISTENT WITH THE  
OBSERVED EFFECTS OF PLASTICALLY DEFORMED AS-QUENCHED  
MARTENSITE. THE EFFECTS CAN BE RATIONALIZED ON THE  
BASIS THAT EACH VACANCY CAN TIE UP AT LEAST TWO  
CARBON ATOMS, EFFECTIVELY TAKING THE ATOMS OUT OF  
SOLUTION. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-706 842 11/6 13/8  
EDGEWOOD ARSENAL MD

SUCCESSFUL GAS QUENCHING OF 6061 ALUMINUM  
ALLOY.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT. JUL 66-JUL 67,  
APR 70 34P GURTNER, FRANCIS B. ISHUTT,  
PAUL K. , JR.; KIRK, FRANK T. , JR;  
REPT. NO. EA-TR-4375

UNCLASSIFIED REPORT

DESCRIPTORS: (\*ALUMINUM ALLOYS,  
\*QUENCHING(COOLING)), CARBON DIOXIDE,  
BRAZING

(U)

IDENTIFIERS: GAS QUENCHING, ALUMINUM ALLOY  
6061

(U)

THE INVESTIGATION WAS DIRECTED TOWARD GAS QUENCHING OF THIN WALLED ITEMS (0.040 THICKNESS). IT HAS NOT, HOWEVER, BEEN LIMITED JUST TO THICKNESS OF MATERIAL BUT ALSO TO DESIGN AND QUALITY REQUIREMENTS THAT DO NOT LEND THEMSELVES TO CONVENTIONAL QUENCHING METHODS. GAS QUENCHING REQUIREMENTS ARE MANY, BUT THE FOLLOWING CHARACTERISTICS ARE BEING INVESTIGATED: (1) GAS ENTRANCE AND EXIT - NUMBER OF ORIFICES AND ORIENTATION; (2) VOLUME OF GAS (CFH) PER LOAD - CROSS SECTION OF MATERIAL BEING QUENCHED; AND (3) DISTRIBUTION SYSTEM - ESSENTIAL AND RELATIVE TO TYPE OF FURNACE AND PART CONFIGURATION. THE PROGRESSIVE ATTITUDE THROUGHOUT THE INVESTIGATION PROVED THAT CONTAINERS CAN BE GAS QUENCHED TO A T-4 SOLUTION CONDITION, AGED TO T-6, AND VERIFIED BY PHYSICAL PROPERTIES AND HARDNESS VALUES. THE PHYSICAL PROPERTIES AND HARDNESS VALUES HAVE BEEN TAKEN OVER SEVERAL HUNDRED ACTUAL HARDWARE ITEMS TO DETERMINE THE BAKN WIDTH OR VARIATION. IF SIMULATED SAMPLES WERE USED IN THE GAS QUENCHING PROCESS, EXTRAPOLATION WOULD BE NECESSARY. NONE OF THE CONTAINERS WERE DISTORTED IN THIS PROCESS. THE QUENCHING BY GAS FROM 980F IS ACCOMPLISHED IN THE SAME CONTAINER OR FURNACE AS THE HEATING AND SOAK TIME. IN ORDER TO MAINTAIN PHYSICAL PROPERTIES, MATERIAL MUST BE REMOVED FROM THE FURNACE IN A VERY SHORT PERIOD OF TIME TO REDUCE THE EFFECT OF RESIDUAL HEATING. SUCCESSFUL GAS QUENCHING WAS ACCOMPLISHED IN A RETORT DEVELOPED BY EDGEWOOD ARSENAL PERSONNEL. (AUTHOR)

(U)



UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMCI

AD-707 740 11/6 20/12  
LOCKHEED-GEORGIA CO MARIETTA MATERIALS RESEARCH AND  
DEVELOPMENT LAB

MECHANISM OF SUPERPLASTICITY IN AL-70%ZN  
ALLOY.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT. NO. 3, 20 JUN 69-20  
JUN 70,  
JUN 70 32P UNDERWOOD, ERVIN E. ILEE,  
ENU U. KRANZLEIN, HARVARD M. I  
CONTRACT: N00014-67-C-0503  
PROJ: NR-031-723

UNCLASSIFIED REPORT

DESCRIPTORS: (\*ALUMINUM, DEFORMATION), (\*ZINC  
ALLOYS, DISLOCATIONS), ALUMINUM ALLOYS,  
PLASTICITY, HEAT OF ACTIVATION, RECOVERY  
IDENTIFIERS: SUPERPLASTICITY

(U)

(U)

ACTIVATION ENERGIES WERE OBTAINED FOR DYNAMIC  
RECOVERY AND FOR TENSILE DEFORMATION. THE VALUES  
FOR DEFORMATION ARE  $\Delta H_{\text{SUB D}} = 22.5 \text{ PLUS OR MINUS } 3.5 \text{ KCAL/MOL}$  (AT LOW TEMPERATURES) AND  
 $\Delta H_{\text{SUB D}} = 37.5 \text{ PLUS OR MINUS } 2.5 \text{ KCAL/MOL}$   
(AT HIGH TEMPERATURES). THESE TWO ACTIVATION  
ENERGIES ARE RELATED TO THE RATE-CONTROLLING  
PROCESSES OF CROSS-SLIP AND DISLOCATION CLIMB,  
RESPECTIVELY. THUS, THE ACTIVATION ENERGY FOR  
DYNAMIC RECOVERY,  $\Delta H_{\text{SUB R}} = 22 \text{ KCAL/MOL}$ ,  
CORRESPONDS TO THE CROSS-SLIP OF SCREW DISLOCATIONS,  
WHICH LEADS TO THE FORMATION OF STABLE DISLOCATION  
NETWORKS AND DISLOCATION-FREE SUB-GRAINS. AT HIGHER  
DEFORMATION TEMPERATURES, DISLOCATION CLIMB  
PREDOMINATES, AND SUBBOUNDARY DISINTEGRATION AND  
COALESCENCE OF SUBGRAINS ARE OBSERVED. DISLOCATION  
LOOPS HAVE BEEN REPORTED MOSTLY IN FCC METALS AND  
ALLOYS AFTER QUENCHING FROM ELEVATED TEMPERATURES AND  
SUBSEQUENT AGING. THIS PAPER REPORTS THE FORMATION  
AND CHARACTERISTICS OF DISLOCATION LOOPS IN THE HCP  
ZN-0.7%AL ALLOY RESULTING FROM QUENCHING AND  
AGING. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-709 043 11/6  
BOEING CO RENTON WASH COMMERCIAL AIRPLANE GROUP

USE OF PRECRACKED SPECIMENS IN SELECTING HEAT  
TREATMENTS FOR STRESS-CORROSION RESISTANCE IN  
HIGH-STRENGTH ALUMINUM ALLOYS,

(U)

NOV 69 21P HYATT, MICHAEL V. ;  
REPT. NO. D6-24467  
CONTRACT: N00014-66-C-0365, ARPA ORDER-878

UNCLASSIFIED REPORT

DESCRIPTORS: (\*ALUMINUM ALLOYS, \*STRESS  
CORROSION), (\*HEAT TREATMENT, ALUMINUM ALLOYS),  
CANTILEVER BEAMS, CRACK PROPAGATION,  
AGING(MATERIALS), QUENCHING(COOLING)  
IDENTIFIERS: ALUMINUM ALLOY 7075

(U)

(U)

THREE TECHNIQUES USING PRECRACKED DOUBLE CANTILEVER  
BEAM (DCB) SPECIMENS WERE EMPLOYED TO MEASURE  
RESISTANCE TO STRESS-CORROSION CRACK PROPAGATION AS A  
FUNCTION OF THE DEGREE OF OVERAGING IN THE ALLOY  
7075. TWO TECHNIQUES USED SINGLE DCB SPECIMENS  
CONTAINING AGING GRADIENTS ALONG THEIR LENGTHS. THE  
THIRD TECHNIQUE USED MULTIPLE DCB SPECIMENS, EACH  
ONE HAVING A DIFFERENT HEAT TREATMENT. ALL THREE  
TECHNIQUES GAVE SIMILAR RESULTS, BUT STRESS-CORROSION  
RESISTANCE AS A FUNCTION OF HEAT TREATMENT WAS  
DETERMINED MOST RAPIDLY USING SEPARATE DCB  
SPECIMENS HAVING DIFFERENT HEAT TREATMENTS. DATA  
FROM THIS STUDY SUGGEST THAT DCB SPECIMENS WOULD BE  
USEFUL IN SEVERAL OTHER STRESS-CORROSION STUDY AREAS,  
INCLUDING THAT OF THERMO MECHANICAL TREATMENTS FOR  
ALUMINUM ALLOYS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-709 047 11/6  
BOEING CO RENTON WASH COMMERCIAL AIRPLANE GROUP

USE OF PRECRACKED SPECIMENS IN STRESS-CORROSION  
TESTING OF HIGH-STRENGTH ALUMINUM ALLOYS, (U)

NOV 69 58P HYATT, MICHAEL V. I  
REPT. NO. D6-24466  
CONTRACT: N00014-66-C-0365, ORDER-878

UNCLASSIFIED REPORT

DESCRIPTORS: (\*ALUMINUM ALLOYS, \*STRESS  
CORROSION), (\*HEAT TREATMENT, ALUMINUM ALLOYS),  
CANTILEVER BEAMS, CRACK PROPAGATION,  
QUENCHING(COOLING), SODIUM CHLORIDE (U)  
IDENTIFIERS: ALUMINUM ALLOY 7075, ALUMINUM ALLOY  
7079, ALUMINUM ALLOY 2024 (U)

RESISTANCE TO STRESS-CORROSION CRACKING OF 10 HIGH-  
STRENGTH ALUMINUM ALLOYS IN A VARIETY OF HEAT-  
TREATMENT CONDITIONS WAS MEASURED USING PRECRACKED  
DOUBLE CANTILEVER BEAM (DCB) SPECIMENS. A NEW  
TECHNIQUE IS DESCRIBED, AND STRESS-CORROSION CRACK  
GROWTH RATES FOR THE ALLOYS TESTED ARE PRESENTED AS A  
FUNCTION OF THE PLANE-STRAIN STRESS INTENSITY  $K_{II}$ .  
DOUBLE CANTILEVER BEAM SPECIMEN DATA CORRELATED  
WITH ESTABLISHED TRENDS FROM SMOOTH SPECIMENS TESTED  
BY ALTERNATE IMMERSION IN 3.5% NaCl SOLUTION.

FROM THE CRACK GROWTH RATE DATA AND THE SPEED AND  
SIMPLICITY WITH WHICH IT IS OBTAINED, IT IS CONCLUDED  
THAT THE DCB SPECIMEN WILL BE HIGHLY USEFUL FOR  
(1) COMPARING AND RATING ALLOYS, (2)  
DEVELOPING NEW ALLOYS AND HEAT TREATMENTS, (3)  
COMPARING THE EFFECTS OF ENVIRONMENTS, (4)  
ACHIEVING OR ENSURING PRODUCT UNIFORMITY, AND (5)  
STUDYING MECHANISMS OF CRACKING. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-709 050 11/6  
BOEING CO RENTON WASH COMMERCIAL AIRPLANE GROUP

EFFECT OF QUENCHING RATE ON STRESS-CORROSION CRACK  
GROWTH RATES IN 2024-T4 ALUMINUM, (U)

NOV 69 12P HYATT, MICHAEL V. I  
REPT. NO. D6-24471  
CONTRACT: N00014-66-C-0365, ARPA ORDER-878

UNCLASSIFIED REPORT

DESCRIPTORS: (\*ALUMINUM ALLOYS, \*STRESS  
CORROSION), (\*HEAT TREATMENT, ALUMINUM ALLOYS),  
CANTILEVER BEAMS, CRACK PROPAGATION,  
QUENCHING(COOLING) (U)  
IDENTIFIERS: ALUMINUM ALLOY 2024 (U)

STRESS-CORROSION CRACK GROWTH RATES IN DOUBLE  
CANTILEVER BEAM SPECIMENS OF 2024-T4 ALUMINUM  
QUENCHED AT TWO RATES FROM THE SOLUTION-TREATMENT  
TEMPERATURE WERE COMPARED. THE SPECIMENS QUENCHED  
AT THE SLOWER RATE HAD THE FASTER CRACK GROWTH RATE.  
THIS FINDING AGREES WITH DATA FROM OTHER STUDIES IN  
WHICH INTERGRANULAR CORROSION SUSCEPTIBILITY WAS  
DETERMINED BY MEASURING PERCENT LOSS IN TENSILE  
STRENGTH OF PREEXPOSED SHEET TENSION SPECIMENS.  
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-709 051 11/6

BOEING CO RENTON WASH COMMERCIAL AIRPLANE GROUP

EFFECTS OF RESIDUAL STRESSES ON STRESS-CORROSION  
CRACK GROWTH RATES IN ALUMINUM ALLOYS,

(U)

NOV 69 23P HYATT, MICHAEL V. I

REPT. NO. D6-24469

CONTRACT: N00014-66-C-0365, ARPA ORDER-878

UNCLASSIFIED REPORT

DESCRIPTORS: (\*ALUMINUM ALLOYS, \*STRESS  
CORROSION), (\*HEAT TREATMENT, ALUMINUM ALLOYS),  
CANTILEVER BEAMS, CRACK PROPAGATION,  
QUENCHING(COOLING)

(U)

IDENTIFIERS: ALUMINUM ALLOY 7075, ALUMINUM ALLOY  
7079, ALUMINUM ALLOY 7175

(U)

STRESS-CORROSION CRACK GROWTH RATE DATA OBTAINED AS  
A FUNCTION OF THE PLANE-STRAIN STRESS INTENSITY USING  
DOUBLE CANTILEVER BEAM SPECIMENS OF 7079, 7075, AND  
7175 ARE PRESENTED. THE EFFECTS OF QUENCHED-IN  
RESIDUAL STRESSES ON CRACK GROWTH RATES IN SPECIMENS  
OF THIS DESIGN ARE DISCUSSED, AND METHODS OF  
ELIMINATING THE RESIDUAL-STRESS PROBLEM ARE  
PRESENTED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZONCI

AD-710 130 18/10 11/6  
NAVAL RESEARCH LAB WASHINGTON D C

EXPERIMENTAL DEVELOPMENT OF RADIATION RESISTANT 85,  
000 PSI YIELD STRENGTH REACTOR VESSEL LOW ALLOY  
STEEL FILLER METAL (PRE-IRRADIATION EVALUATION), (U)

FEB 70 BP HAWTHORNE, J. R. IGRANT, S.  
P. IORTNER, EDWARD I

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN ASME PAPER NO. 70-MET-  
3.

SUPPLEMENTARY NOTE: PRESENTED AT THE ASME METALS  
ENGINEERING CONFERENCE AND AWS WELDING SHOW,  
CLEVELAND, OHIO, 20-24 APR 70.

DESCRIPTORS: (\*REACTOR MATERIALS, \*STEEL),  
RADIATION DAMAGE, EMBRITTLEMENT, MICROSTRUCTURE,  
CHROMIUM ALLOYS, MOLYBDENUM ALLOYS, COPPER ALLOYS,  
NICKEL ALLOYS, MANGANESE ALLOYS, MECHANICAL  
PROPERTIES (U)

SMALL AMOUNTS OF COPPER ARE KNOWN TO ENHANCE THE  
550 F RADIATION EMBRITTLEMENT SENSITIVITY OF ALLOY  
STEEL PLATE AND WELD METALS. PREIRRADIATION DATA  
ARE PRESENTED FROM A STATISTICAL PROGRAM AIMED AT  
DEFINING COMPOSITION LIMITS OF A NEW WELD METAL FOR  
QUENCHED AND TEMPERED A543 AND A542 STEELS BASED  
ON 2-1/4CR-1MO AND VARYING COPPER, NICKEL, AND  
MANGANESE. AS-WELDED PLUS STRESS RELIEF NOTCH  
DUCTILITY PROPERTIES ARE MUCH IMPROVED WHEN THE  
MANGANESE CONTENT IS KEPT LOW (0.75 PERCENT).  
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-710 521 13/5 13/8  
BATTELLE MEMORIAL INST COLUMBUS OHIO

EFFECT OF FLAME AND MECHANICAL STRAIGHTENING ON  
MATERIAL PROPERTIES OF WELDMENTS.

(U)

DESCRIPTIVE NOTE: SUMMARY REPT.,  
70 50P PATTEE, H. E. EVANS, R.  
M. MONROE, R. E. I  
CONTRACT: N00024-68-C-5324  
PROJ: SR185  
MONITOR: SSC 207

UNCLASSIFIED REPORT

DESCRIPTORS: (\*WELDS, ALIGNMENT), STEEL, HEAT  
TREATMENT, MECHANICAL WORKING, DISTORTION,  
REMOVAL

(U)

IDENTIFIERS: \*METAL STRAIGHTENING

(U)

AN EXPERIMENTAL STUDY WAS CONDUCTED TO DETERMINE  
THE EFFECTS OF MECHANICAL STRAIGHTENING AND FLAME  
STRAIGHTENING ON THE PROPERTIES OF STEELS USED IN  
SHIPBUILDING. THE STEELS INVESTIGATED DURING THIS  
PROGRAM INCLUDED AN ORDINARY CARBON STEEL (ABS-  
B), TWO LOW-ALLOY, HIGH-STRENGTH STEELS (A441 AND  
A537), AND A QUENCHED AND TEMPERED STEEL (A517,  
GRADE A). THE REMOVAL OF DISTORTION IN UNWELDED  
AND WELDED TEST PLATES WAS ACCOMPLISHED BY (1)  
MECHANICAL STRAIGHTENING AT ROOM TEMPERATURE,  
1000F, 1300F, AND (2) FLAME STRAIGHTENING IN  
THE TEMPERATURE RANGES OF 1100-1200F AND 1300-  
1400F. CONTROLLED AMOUNTS OF DISTORTION WERE  
PROVIDED IN UNWELDED PLATE BY MECHANICAL BENDING;  
DISTORTION IN WELDED PLATES WAS PROVIDED BY JIGGING  
THE RESTRAINT CONTROL. DROP-WEIGHT TEAR TESTS WERE  
CONDUCTED TO ASSESS THE EFFECT OF THE STRAIGHTENING  
PARAMETERS ON THE NOTCH-TOUGHNESS BEHAVIOR OF THE  
RESPECTIVE STEELS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-710 789 11/6  
CASE WESTERN RESERVE UNIV CLEVELAND OHIO DIV OF  
METALLURGY AND MATERIALS SCIENCE

THE INFLUENCE OF STRUCTURAL PARAMETERS ON THE YIELD  
STRENGTH OF TEMPERED MARTENSITE AND LOWER  
BAINITE. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
JUL 70 33P SMITH, D. W. IHEHEMANN, R.

F. I  
REPT. NO. TR-1  
CONTRACT: N00014-67-A-0404-0001  
PROJ: NR-031-717

UNCLASSIFIED REPORT

DESCRIPTORS: (\*STEEL, \*TEMPERING), MARTENSITE,  
BAINITE, TENSILE PROPERTIES, DISPERSION HARDENING,  
GRAIN STRUCTURES (METALLURGY) (U)  
IDENTIFIERS: STEEL 4340 (U)

THE CONTRIBUTIONS TO THE YIELD STRENGTH OF TEMPERED  
MARTENSITIC AND BAINITIC STRUCTURES WAS EXAMINED IN  
4340 STEEL. THE PRINCIPAL FACTORS THAT CONTRIBUTE  
TO THE REDUCTION IN YIELD STRENGTH WITH TEMPERING IN  
THE RANGE FROM 600 TO 1000F ARE CARBIDE COARSENING  
AND ENLARGEMENT OF THE CELLULAR SUBSTRUCTURE. THE  
YIELD STRENGTH OF BOTH TEMPERED MARTENSITIC AND  
BAINITIC STRUCTURES CAN BE DESCRIBED IN TERMS OF CELL  
SIZE AND DISPERSOID DISTRIBUTION BY A SINGLE  
RELATIONSHIP IN WHICH THE OROWAN MODEL IS EMPLOYED  
FOR THE CONTRIBUTION FROM DISPERSION HARDENING AND  
THE LANGFORD-COHEN MODEL FOR THAT FROM CELL SIZE.  
(AUTHOR) (U)



UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-710 807 11/6  
POLYTECHNIC INC OF BROOKLYN N Y DEPT OF PHYSICAL AND  
ENGINEERING METALLURGY

FIRST AND SECOND ORDER PHASE CHANGES IN SPLAT  
COOLED AU-CD AND AU-ZN ALLOYS.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
AUG 69 31P FERRAGLIO, PAUL INUKHERJEE, K.  
ICASTLEMAN, L. S. ;  
REPT. NO. TR-1  
CONTRACT: N00014-67-A-0438-0002  
PROJ: NR-031-731

UNCLASSIFIED REPORT

DESCRIPTORS: (\*GOLD ALLOYS, PHASE STUDIES),  
CADMIUM ALLOYS, ZINC ALLOYS, COOLING, GRAIN  
STRUCTURES(METALLURGY)

(U)

IDENTIFIERS: SPLAT COOLING

(U)

X-RAY DIFFRACTION, TRANSMISSION ELECTRON MICROSCOPY  
AND SELECTED AREA ELECTRON DIFFRACTION STUDIES WERE  
PERFORMED ON SPLAT COOLED EQUI-ATOMIC AU-CD AND  
AU-ZN ALLOYS. A VERTICAL SHOCK-TUBE APPARATUS  
IS USED FOR SPLAT QUENCHING SAMPLES FROM VARIOUS  
TEMPERATURES. A SUBSTANTIAL INCREASE IN  
SUPERLATTICE LINE INTENSITIES WERE OBSERVED FOR BOTH  
ALLOYS AFTER SPLAT COOLING. THIS RESULT WAS  
TENTATIVELY INTERPRETED IN TERMS OF THE FORMATION OF  
PREFERENTIAL SUBLATTICE VACANCIES. A NEW MORPHOLOGY  
AND CRYSTAL STRUCTURE OF THE MARTENSITIC PHASE IN  
SPLAT COOLED AU-CD ALLOY WERE OBSERVED AND A  
PERIODICALLY FAULTED MARTENSITE LIKE PHASE WAS  
OBSERVED IN A SPLAT COOLED 50 AT.% AU-ZN ALLOY.  
ALSO OBSERVED IN THE SPLAT COOLED AU-ZN ALLOY  
WAS A HITHERTO UNREPORTED MODULATED STRUCTURE.  
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-712 474 11/6  
PENNSYLVANIA UNIV PHILADELPHIA SCHOOL OF METALLURGY AND  
MATERIALS SCIENCE

PLASTIC PROPERTIES AND FRACTURE OF TITANIUM-  
ALUMINUM ALLOYS.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 27 MAY 68-26 MAY 69,  
JUL 69 33P TRUAX, D. J. MCMAHON, C.  
J. , JR!  
CONTRACT: N00019-68-C-0384

UNCLASSIFIED REPORT

DESCRIPTORS: (\*TITANIUM ALLOYS, \*STRESS  
CORROSION), ALUMINUM ALLOYS, PLASTICITY,  
FRACTURE(MECHANICS), STRAIN(MECHANICS)

(U)

A PROGRAM OF RESEARCH WAS CONDUCTED TO DETERMINE  
THE EFFECTS OF AL CONTENT AND T13AL  
PRECIPITATION O THE MICRO- AND MACROPLASTIC BEHAVIOR  
OF T1-AL ALLOYS, AND ALSO TO INVESTIGATE THE  
EFFECTS OF AL CONTENT AND T13AL ON THE  
SUSCEPTIBILITY TO, AND MECHANISM OF, STRESS CORROSION  
CRACKING IN A METHANOL - 1.5% HCL ENVIRONMENT.  
THE TENSILE MICROSTRAIN PARAMETERS SIGMA SUB E  
AND SIGMA SUB A INCREASE WITH AL CONTENT. TESTS  
ON AGED T1-6 AND T1-8 WT. % AL MATERIAL  
INDICATE THAT THE INFLUENCE OF T13AL ON THE  
MICROSTRAIN PARAMETERS AND FLOW STRESS IS ATHERMAL.  
STRESS CORROSION SPECIMENS WHICH HAD BEEN SOLUTION  
TREATED AND QUENCHED FAILED PRIMARILY BY  
INTERGRANULAR PARTING. SPECIMENS IN THE AGED  
CONDITION EXHIBIT A MIXTURE OF CLEAVAGE FRACTURES AND  
SOME INTERGRANULAR PARTING. IT IS THOUGHT THAT  
STRESS CORROSION FAILURE IN T1-AL ALLOYS PROCEEDS  
AS A CONSEQUENCE OF ANODIC DISSOLUTION. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-712 485 13/8  
PHILCO-FORD CORP NEWPORT BEACH CALIF AERONUTRONIC DIV

PRELIMINARY THERMOMECHANICAL TREATMENT OF D6AC  
STEEL. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
OCT 70 29P KOPPENAL, THEODORE J. ;  
REPT. NO. TR-1  
CONTRACT: N00014-70-C-0223  
PROJ: NR-031-742

UNCLASSIFIED REPORT

DESCRIPTORS: (\*HEAT TREATMENT, \*STEEL),  
DEFORMATION, MECHANICAL PROPERTIES (U)  
IDENTIFIERS: STEEL D6AC, \*THERMOMECHANICAL  
TREATMENT (U)

THE EFFECT OF PRELIMINARY THERMOMECHANICAL  
TREATMENT ON THE STRENGTH, ELONGATION, HARDNESS, X-  
RAY LINE BROADENING, AND PRIOR AUSTENITE GRAIN SIZE  
OF D6AC STEEL WAS INVESTIGATED. IN THIS TYPE OF  
TREATMENT THE DEFORMATION IS PERFORMED PRIOR TO  
AUSTENITIZING, AND RAPID RATE HEATING TO THE  
AUSTENITIZING TEMPERATURE MUST BE USED. THE  
RESPONSE TO PRELIMINARY THERMOMECHANICAL TREATMENT  
WAS DETERMINED AS A FUNCTION OF PRIOR STRUCTURE,  
AMOUNT OF PRIOR DEFORMATION, AUSTENITIZING  
TEMPERATURE AND TIME, PRE-AUSTENITIZING HEAT  
TREATMENT, AND TEMPERING TEMPERATURE. THUS FAR, THE  
YIELD STRENGTH HAS BEEN INCREASED ABOUT 25 PERCENT  
ALONG WITH A SIGNIFICANT INCREASE IN TENSILE  
ELONGATION FOR SOME TEMPERING TEMPERATURES. THE  
TENSILE STRENGTH, HOWEVER, REMAINS ESSENTIALLY  
CONSTANT. A COMPARISON OF THE X-RAY LINE  
BROADENING AND YIELD STRENGTH MEASUREMENTS INDICATES  
THAT THESE PARAMETERS ARE BEING INFLUENCED BY THE  
SAME STRUCTURAL CHANGES. THE RESULTS ARE EXPLAINED  
ON THE BASIS OF A RETENTION OF THE WORK HARDENED  
STRUCTURE (INTRODUCED DURING THE PRIOR  
DEFORMATION) THROUGH THE AUSTENITE AND MARTENSITE  
TRANSFORMATIONS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-712 809 11/4  
RENSSELAER POLYTECHNIC INST TROY N Y MATERIALS DIV

TRANSMISSION ELECTRON MICROSCOPY STUDY OF AL-ZN-MG. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
OCT 70 28P JUDD, G. ISHAstry, C. R. I  
REPT. NO. TR-1  
CONTRACT: N00014-67-A-0117-0009

UNCLASSIFIED REPORT

DESCRIPTORS: (ALUMINUM ALLOYS, GRAIN  
STRUCTURES(METALLURGY)), ELECTRON MICROSCOPY,  
MICROSTRUCTURE, ZINC ALLOYS, MAGNESIUM ALLOYS,  
GRAIN BOUNDARIES (U)

THE EFFECT OF QUENCH RATE ON THE DISTRIBUTION OF  
PRECIPITATES IN THE MATRIX AND AT THE GRAIN  
BOUNDARIES WITH SPECIAL ATTENTION TO THE FORMATION OF  
GRAIN BOUNDARY PRECIPITATE FREE ZONES IN AN AL-  
ZN-MG ALLOY AGED AT TWO DIFFERENT TEMPERATURES  
WAS STUDIED BY TRANSMISSION ELECTRON MICROSCOPY.  
FOR RELATIVELY FAST QUENCHED SPECIMENS, DEFINITE  
CORRELATION WAS FOUND TO EXIST BETWEEN THE WIDTH OF  
PRECIPITATE FREE ZONES AND THE EXTENT OF GRAIN  
BOUNDARY PRECIPITATION. THE VARIATION OF  
PRECIPITATE FREE ZONE WIDTH WITH QUENCH RATE WAS ALSO  
FOUND TO DEPEND ON THE GRAIN BOUNDARY TYPE. FOR  
RELATIVELY SLOW QUENCHED SPECIMENS, A FINE MATRIX  
PRECIPITATE DISTRIBUTION WITH NARROW GRAIN BOUNDARY  
PRECIPITATE FREE ZONES WAS OBSERVED. THE RESULTS  
ARE DISCUSSED IN TERMS OF THE CURRENT-THEORIES OF  
PRECIPITATION IN ALUMINUM ALLOYS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-713 747 11/6  
POLYTECHNIC INC OF BROOKLYN N Y DEPT OF PHYSICAL AND  
ENGINEERING METALLURGY

MARTENSITIC TRANSFORMATION IN A SPLAT COOLED AU-50  
AT% CD ALLOY. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
MAR 70 7P FERRAGLIO, PAUL; MUKHERJEE, K.  
; CASTLEMAN, L. S. ;  
REPT. NO. TR-2  
CONTRACT: N00014-67-A-0438-0002  
PROJ: NR-031-731

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN ACTA METALLURGICA, V18  
P1067-1070 OCT 70.

DESCRIPTORS: (\*GOLD ALLOYS, PHASE STUDIES),  
(\*CADMIUM ALLOYS, PHASE STUDIES), COOLING (U)  
IDENTIFIERS: PHASE TRANSFORMATIONS, SPLAT  
COOLING (U)

MARTENSITIC TRANSFORMATIONS WERE STUDIED IN SPLAT  
COOLED SAMPLES OF AN AU-50 AT.% CD ALLOY. A  
VERTICAL SHOCK-TUBE APPARATUS WAS USED TO QUENCH THE  
MOLTEN ALLOY FROM VARIOUS CONTROLLED TEMPERATURES IN  
THE LIQUID STATE TO ROOM TEMPERATURE, THE QUENCHING  
RATE BEING OF THE ORDER OF 10 TO THE 7TH POWER C/  
SEC. THE SPLAT COOLED SAMPLES WERE STUDIED BY THE  
USE OF X-RAY AND ELECTRON DIFFRACTION AS WELL AS  
TRANSMISSION ELECTRON MICROSCOPY. IT WAS FOUND THAT  
QUENCHING, EVEN AT THIS HIGH SPEED, FROM TEMPERATURES  
AS HIGH AS 300C ABOVE THE MELTING POINT OF THIS  
ALLOY DID NOT AFFECT ITS LONG RANGE ORDER.  
FURTHERMORE, THE MARTENSITIC TRANSFORMATION  
TEMPERATURE WAS SUPPRESSED IN THE SPLAT COOLED  
SAMPLES, AND THE HIGH TEMPERATURE BETA-PHASE CSCL  
TYPE STRUCTURE PERSISTED. THIS METASTABLE STRUCTURE  
WAS THEN FOUND TO DECOMPOSE ISOTHERMALLY AT ROOM  
TEMPERATURE INTO THREE MORPHOLOGICALLY AND  
CRYSTALLOGRAPHICALLY DIFFERENT MARTENSITIC PHASES.  
EXCELLENT RESOLUTION OF THE MARTENSITIC FINE  
STRUCTURE WAS OBTAINED BY THIS SPLAT COOLING  
TECHNIQUE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-713 921 11/6 13/8  
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D  
C

CHANGE IN PROPERTIES DURING AGING OF  
ALUMINUM ALLOYS (ZAKONOMERNOST IZMEHENIYA  
SVOISTV PRI STARENII ALYUMINIEVYKH  
SPLAVOV),

(U)

SEP 70 16P FRIDLYANDER, I. N. ;  
REPT. NO. FSTC-HT-23-236-70

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRANS. OF MONO. LIGHTWEIGHT  
ALLOYS AND THEIR TREATMENT METHODS, MOSCOW, 1968  
P90-101.

DESCRIPTORS: (\*ALUMINUM ALLOYS,  
AGING(MATERIALS)), MECHANICAL PROPERTIES,  
ANNEALING, USSR  
IDENTIFIERS: TRANSLATIONS

(U)

(U)

ACCORDING TO A. A. BOCKVAR, THE TYPE OF HEAT  
TREATMENT BASED ON THE PROCESSES OF A DISSOCIATION OF  
A STATE OF AN ALLOY FIXED BY HARDENING, IS CALLED  
ANNEALING OR AGING. DURING ARTIFICIAL AGING IN  
DISTINCTION TO NATURAL AGING NOT ONLY ARE THE  
PROCESSES OF DISSOCIATION OF THE SUPERSATURATED  
SOLUTION ACCELERATED BUT ANOTHER STRUCTURE AND A  
DIFFERENT COMPLEX OF MECHANICAL AND PHYSICAL  
PROPERTIES OF THE ALLOYS APPEAR. WHEN INCREASING  
THE DURATION OF THE ARTIFICIAL AGING OR WHEN  
INCREASING THE AGING TEMPERATURE ABOVE THE  
CONDITIONS, WHICH LEAD TO MAXIMUM HARDNESS THERE  
OCCURS A LOWERING OF THE HARDNESS AND A CREEP LIMIT,  
AND ELONGATION INCREASES INSIGNIFICANTLY OR DOESN'T  
CHANGE REMAINING AT A COMPARATIVELY LOW LEVEL.  
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-713 979 13/8 11/6  
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D  
C

EFFECT OF COMBINED DEFORMATION AND HEAT  
TREATMENT ON PROPERTIES OF ALUMINUM ALLOYS  
(VLNYANIE SOVMESHCHENNOI DEFORMATSIONNO-  
TERMICHESKOI OBRABOTKI NA SVOISTVA  
ALYUMINIEVYKH SPLAVOV),

(U)

SEP 70 21P RABINOVICH, M. KH. I  
REPT. NO. FSTC-HT-23-237-70

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRANS. OF MONO. LIGHTWEIGHT  
ALLOYS AND THEIR TREATMENT METHODS, MOSCOW, 1968  
P102-114.

DESCRIPTORS: (\*HEAT TREATMENT, \*ALUMINUM ALLOYS),  
DEFORMATION, MECHANICAL WORKING, HARDNESS,  
USSR

(U)

IDENTIFIERS: \*THERMOMECHANICAL TREATMENT,  
TRANSLATIONS

(U)

THE EFFECTS OF COMBINED TREATMENT ON THE PROPERTIES  
AND STRUCTURE OF A BROAD CLASS OF ALLOYS ARE  
INVESTIGATED. THE RESULTS OF TESTS INDICATE THAT  
COMBINED TREATMENT HAS A NEGATIVE EFFECT ON ALLOYS IN  
THE FRESHLY ANNEALED STATE. THE HARDNESS OF ALLOYS  
AFTER DEFORMATION AT THE TEMPERATURE OF NORMAL  
HARDENING WITH SUBSEQUENT RAPID COOLING WAS LESS THAN  
THAT OF THE SAME ALLOYS AFTER ONLY QUENCHING.  
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-714 120 13/8 11/6  
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D  
C

STRENGTHENING OF MAGNESIUM ALLOYS RICH IN  
ALUMINUM BY COMBINED ACTION OF PLASTIC  
DEFORMATION AND HEAT TREATMENT (UPROCHENIE  
MAGNIEVYKH SPLAVOV, BOGATYKH ALUMINIEM  
PUTEM SOVMESTNOGO VOZDEISTVIYA PLASTICHESKOI  
DEFORMATSII I TERMICHESKOI OBRABOTKI),

(U)

SEP 70 17P SVIDERSKAYA, Z. A. I  
REPT. NO. FSTC-HT-23-240-70

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRANS. OF MONO. LIGHTWEIGHT  
ALLOYS AND THEIR TREATMENT METHODS, MOSCOW, 1968  
P199-207.

DESCRIPTORS: (\*HEAT TREATMENT, \*MAGNESIUM ALLOYS),  
DEFORMATION, ALUMINUM ALLOYS, MECHANICAL WORKING,  
HARDNESS, USSR

(U)

IDENTIFIERS: \*THERMOMECHANICAL TREATMENT,  
TRANSLATIONS

(U)

THE RESULTS OF STUDIES ON THE DETERMINATION OF A  
MORE EFFECTIVE METHOD OF STRENGTHENING AGING ALLOY OF  
THE TYPE MA 5, A MEMBER OF THE MG-AL-ZN-MN  
SYSTEM. THE INITIAL MATERIAL CONSISTED OF HOT  
PRESSED BARS 16MM IN DIAMETER. THE EFFECT OF  
VARIOUS CONDITIONS OF HEAT AND HEAT PLUS MECHANICAL  
TREATMENT ON THE PROPERTIES OF MA 5 ALLOY IS  
EXAMINED USING SPECIMENS SUBJECTED TO QUENCHING AND  
IN THE HOT PRESSED STATE. (AUTHOR)

(U)



UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY    SEARCH CONTROL NO. /ZOHCI

AD-715 877                    11/6  
BATTELLE MEMORIAL INST COLUMBUS OHIO COLUMBUS LABS

MECHANICAL-PROPERTY DATA 38-6-44 TITANIUM  
ALLOY: AGED FORGING.

(U)

SEP 70                    9P  
CONTRACT: F33615-69-C-1115  
PROJ: AF-7381  
TASK: 738106

UNCLASSIFIED REPORT

DESCRIPTORS: (•TITANIUM ALLOYS, MECHANICAL  
PROPERTIES), ALUMINUM ALLOYS, VANADIUM ALLOYS,  
CHROMIUM ALLOYS, MOLYBDENUM ALLOYS, ZIRCONIUM  
ALLOYS

(U)

38-6-44 ALLOY (3AL-8V-6CR-4MO-4ZR) IS A  
NEW DEEP-HARDENING BETA COMPOSITION ALLOY. THE  
LARGE AMOUNT OF BETA STABILIZING ELEMENTS IN THIS  
COMPOSITION RESULTS IN SLUGGISH TRANSFORMATION  
CHARACTERISTICS WHICH GIVE DEEP HARDENING. THE  
METALLURGY OF 38-6-44 ALLOY IS SIMILAR TO OTHER BETA  
ALLOYS SUCH THAT SOLUTION ANNEALING RETAINS THE MORE  
DUCTILE BODY-CENTER-CUBIC BETA PHASE AT ROOM  
TEMPERATURE. THE 6-INCH BY 6-INCH BILLET USED IN  
THIS PROPERTY SURVEY WAS SOLUTION ANNEALED AT 1500  
F FOR 15 MINUTES AND AIR COOLED, PLUS AGING AT 1050  
F FOR FOUR HOURS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-716 076 11/6  
WASHINGTON UNIV SEATTLE

FATIGUE HARDENING IN ANNEALED AND DEFORMED  
ALUMINUM AND COPPER,

(U)

FEB 70 6P VAN DEN BEUKEL, A. MISRA,  
M. S. DAWSON, H. I. I  
CONTRACT: DA-ARO(D)-31-124-G1039  
PROJ: DA-2-0-061102-B-32-D  
MONITOR: AROD 7504:3-MC

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN METALLURGICAL  
TRANSACTIONS, V1 P2111-2113 AUG 70.

SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH DELFT  
INST. OF TECH. (THE NETHERLANDS).

DESCRIPTORS: (\*ALUMINUM ALLOYS,  
FATIGUE(MECHANICS)), (\*COPPER,  
FATIGUE(MECHANICS)), HARDENING  
IDENTIFIERS: ALUMINUM ALLOY 2024

(U)

(U)

FATIGUE HARDENING IN 2024 ALUMINUM AND IN OFHC  
COPPER HAS BEEN INVESTIGATED BY MEASURING THE  
HYSTERESIS-LOOP WIDTH AT ZERO STRESS AS A FUNCTION OF  
THE NUMBER OF TENSION-COMPRESSION CYCLES WITH A  
CONSTANT STRESS AMPLITUDE. PRIOR TO CYCLING, THE  
SPECIMENS WERE EITHER ANNEALED, ELONGATED, OR  
TWISTED. FOR THE ANNEALED AND THE PREELONGATED  
SPECIMENS, THE LOOP WIDTH IS SHOWN TO DECAY WITH THE  
NUMBER OF CYCLES AS A SECOND-ORDER PROCESS, AND FOR  
THE PRETWISTED SPECIMENS, AS A FIRST-ORDER PROCESS.  
THIS BEHAVIOR CAN BE ACCOUNTED FOR BY REASONABLE  
ASSUMPTIONS REGARDING THE DISLOCATION MOVEMENTS  
INVOLVED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-716 228

11/6

DEFENCE STANDARDS LABS MARIBYRNONG (AUSTRALIA)

THE STRUCTURAL FEATURES OF UNDERCOOLED  
NICKEL AND NICKEL-OXYGEN ALLOYS,

(U)

SEP 70 6P JONES, B. L. WESTON, G.  
No. 1

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN THE JNL. OF THE AUSTRALIAN  
INSTITUTE OF METALS, V15 N4 P189-194 NOV 70. NO  
COPIES FURNISHED.

DESCRIPTORS: (\*NICKEL, GRAIN  
STRUCTURES(METALLURGY)), (\*NICKEL ALLOYS, GRAIN  
STRUCTURES(METALLURGY)), COOLING, GRAIN SIZE,  
DENDRITIC STRUCTURE, RECRYSTALLIZATION, AUSTRALIA (U)

A SERIES OF NICKEL INGOTS HAVING OXYGEN CONTENTS  
RANGING BETWEEN 22 AND 540 PPM HAVE BEEN UNDERCOOLED  
BY AMOUNTS UP TO 271 DEGC TO EXAMINE THE SEPARATE  
EFFECTS OF OXYGEN AND UNDERCOOLING ON GRAIN  
STRUCTURE. IN NICKEL CONTAINING MORE THAN 100 PPM  
OXYGEN, UNDERCOOLING BY MORE THAN 100 DEGC PRODUCES  
A UNIFORM VERY FINE GRAIN STRUCTURE (<0.2 MM  
DIA.), BY A DENDRITE ARM REMELTING PROCESS.  
INGOTS CONTAINING LESS THAN 100 PPM OXYGEN  
UNDERCOOLED BY LESS THAN 160 DEGC HAD VERY COARSE  
DENDRITIC STRUCTURES, BUT UNDERCOOLING BY MORE THAN  
160 DEGC CAUSED GRAIN REFINEMENT TO (0.6-0.9  
MM) BY A RECRYSTALLIZATION PROCESS. THIS  
RECRYSTALLIZATION IS BELIEVED TO BE ASSOCIATED WITH  
THE INHIBITION OF RECOVERY PROCESSES BY INTERSTITIAL  
SOLUTE IMPURITIES. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-716 368 11/6  
GENERAL STEEL INDUSTRIES INC GRANITE CITY ILL CASTINGS  
DIV

MANUFACTURING METHODS, AND PHYSICAL  
PROPERTIES OF DIRECTIONALLY SOLIDIFIED 48 IN. X  
60 IN. X 4 IN. AND 5 IN. THICK CAST STEEL  
PLATES.

(U)

DESCRIPTIVE NOTE: FINAL REPT. AUG 67-JAN 70,  
JAN 70 57P PATTON, JOHN R. I  
CONTRACT: DAAG46-67-C-0118  
MONITOR: AMMRC CR-70-6

UNCLASSIFIED REPORT

DESCRIPTORS: (\*STEEL, \*CASTINGS), METAL PLATES,  
CASTING, HEAT TREATMENT, MANUFACTURING METHODS,  
MECHANICAL PROPERTIES, RADIOGRAPHY

(U)

THE WORK COVERS THE DETAILS OF PRODUCTION METHODS  
USED IN PRODUCING EIGHT CAST STEEL PLATES 48 IN. X 60  
IN. X 5 IN. AND 6 IN. THICK. STEEL FOR THIS WORK IS  
A CR - MO COMPOSITION OF .28% C; 2.50% CR;  
.5% MO. CASTING TECHNIQUE FOR THE RAPID  
UNIDIRECTIONALLY SOLIDIFIED SECTION EMPLOYED A 48 IN.  
X 60 IN. X 7 IN. THICKNESS CAST IRON CHILL IN THE  
DRAG WITH A 48 IN. X 60 IN. X 3 IN. THICKNESS  
EXOTHERMIC CORE ON THE COPE SURFACE. THE PLATES  
WERE WATER QUENCHED AND TEMPERED TO A HARDNESS LEVEL  
OF 320 - 370 BHN. FOUNDRY PROCEDURE, HEAT  
TREATMENT, AND PRODUCTION PROCESSING ARE REPORTED IN  
DETAIL. PHYSICAL TEST VALUES OF TENSILE AND IMPACT  
PROPERTIES AND THE RADIOGRAPHIC INSPECTION RESULTS  
ARE REPORTED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-717 328 20/12 11/6  
NORTH CAROLINA STATE UNIV RALEIGH

EXPERIMENTALLY-DETERMINED PLASTIC WAVE  
VELOCITIES IN FULLY-ANNEALED 1100F ALUMINUM  
(STRIKER VELOCITY 89 FT/SEC TO 788 FT/SEC).

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
DEC 70 44P LIDDELL, W. L. STEELE, R.  
S. BINGHAM, W. L. DOUGLAS, R. A. ;  
REPT. NO. TR-70-11  
CONTRACT: N00014-68-A-0187  
PROJ: NR-064-504

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: ERRATA SHEET INSERTED.

DESCRIPTORS: (\*IMPACT TESTS, RODS), (\*ALUMINUM  
ALLOYS, STRAIN(MECHANICS)), PLASTICITY, STRAIN  
GAGES, DIFFRACTION GRATINGS, TEST EQUIPMENT, TEST  
METHODS, LASERS

(U)

IDENTIFIERS: ALUMINUM ALLOY 1100F, PLASTIC  
DEFORMATION, DYNAMIC RESPONSE, RUBY LASERS

(U)

A PREVIOUSLY-REPORTED EXPERIMENTAL SYSTEM FOR  
DETERMINING THE LARGE STRAINS, SURFACE ROTATIONS,  
STRAIN RATES, AND PLASTIC WAVE VELOCITIES DURING  
FREE-FREE AXIAL IMPACTS IS USED TO INVESTIGATE THE  
BEHAVIOR OF FULLY-ANNEALED SMALL GRAIN 1100F  
ALUMINUM RODS UNDER IMPACT CONDITIONS. THE SYSTEM  
EMPLOYS IN-SURFACE DIFFRACTION GRATING STRAIN  
TRANSDUCERS ILLUMINATED BY A PULSED RUBY LASER, WITH  
THE STRAIN-SURFACE ROTATION-TIME-DEPENDENT  
DIFFRACTION PATTERN RECORDED BY HIGH-SPEED STREAK  
CAMERAS. STRAIN-TIME AND PLASTIC WAVE VELOCITY-  
STRAIN DATA ARE PRESENTED FOR FREE-FREE AXIAL IMPACTS  
OF ALUMINUM RODS AT STRIKER VELOCITIES RANGING FROM  
89 FT/SEC TO 788 FT/SEC. STRAINS TO 5.5% AND  
STRAIN-RATES TO 2000/SEC ARE RECORDED. THE DATA IS  
COMPARED TO PREVIOUSLY-REPORTED DATA AS A MEANS OF  
ESTABLISHING THE VALIDITY OF THE EXPERIMENTAL  
TECHNIQUE, AND AS CORROBORATION OF SOME OF THE  
EXISTING DATA. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-717 553 11/6 19/6  
WATERVLIT ARSENAL N Y

SUSCEPTIBILITY OF GUN STEELS TO STRESS  
CORROSION CRACKING.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
NOV 70 47P COLANGELO,VITO J. IFERGUSON,  
MARTIN S. ;  
REPT. NO. WVT-7012  
PROJ: DA-66661

UNCLASSIFIED REPORT

DESCRIPTORS: (\*STEEL, \*STRESS CORROSION), (\*GUN  
BARRELS, STRESS CORROSION), EMBRITTLEMENT,  
FRACTURE(MECHANICS), CRACK PROPAGATION  
IDENTIFIERS: HIGH STRENGTH STEELS

(U)

(U)

PRECRACKED CANTILEVER BEAM SPECIMENS EXTRACTED FROM  
SPECIFIC GUN TUBES WERE SUBJECTED TO A CONSTANT LOAD  
IN VARIOUS ENVIRONMENTS TO DETERMINE FRACTURE TIMES.  
SPECIMENS EXHIBITED STRESS CORROSION SUSCEPTIBILITY  
IN 3% NACL, DISTILLED WATER AND 100% RH  
AIR, WITH 3% NACL BEING THE MOST DEGRADING  
ENVIRONMENT. VARIATIONS IN SUSCEPTIBILITY APPEARED  
ON A TUBE TO TUBE BASIS AND WERE RELATED TO THE  
TEMPER EMBRITTLED CONDITION OF THE TUBE. ADDITIONAL  
TESTS IN DISTILLED WATER, VARYING YIELD STRENGTH  
MATERIAL, SHOWED THAT FRACTURE TIME WAS DECREASED AND  
CRACK GROWTH RATES INCREASED AS THE YIELD STRENGTH  
WAS INCREASED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY, SEARCH CONTROL NO. /ZOMCI

AD-718 041 11/6  
TRW EQUIPMENT GROUP CLEVELAND OHIO MATERIALS TECHNOLOGY  
LAB

EFFECT OF ALLOYING ELEMENTS ON TEMPERED  
MARTENSITE EMBRITTLEMENT AND FRACTURE  
TOUGHNESS OF LOW ALLOY HIGH STRENGTH  
STEELS.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 13 MAR 69-13 AUG 70,  
JAN 71 87P VISHNEVSKY, C. I  
REPT. NO. ER-7384-1  
CONTRACT: DAAG46-69-C-0060  
PROJ: DA-1-T-062105-A-328  
MONITOR: AMMRC CR-69-18/F

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO REPORT DATED FEB 70, AD-  
702 908.

DESCRIPTORS: (\*STEEL, NOTCH TOUGHNESS),  
MARTENSITE, TENSILE PROPERTIES,  
FRACTURE(MECHANICS), EMBRITTLEMENT  
IDENTIFIERS: \*HIGH STRENGTH STEELS

(U)

(U)

A STUDY WAS PERFORMED ON THE INFLUENCE OF VARIOUS  
ELEMENTS ON THE NOTCH BEND FRACTURE TOUGHNESS AT  
75F AND -100F OF .35% C, 3NI-CR-MO-V  
MARTENSITIC STEELS TEMPERED BETWEEN 400 AND 800F.  
THE ELEMENTS EXAMINED INCLUDED C, MN, SI,  
CR, NI, MO, CO, V AND AL. THE OVERALL  
VARIATION IN ROOM TEMPERATURE YIELD AND TENSILE  
STRENGTHS FOR TWENTY-FOUR STEELS WAS 155-230 KSI  
YIELD STRENGTH AND 188-288 KSI TENSILE STRENGTH.  
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-718 902 11/6 13/8  
MASSACHUSETTS INST OF TECH CAMBRIDGE

STRUCTURE AND PROPERTY CONTROL THROUGH RAPID  
QUENCHING OF LIQUID METALS. (U)

DESCRIPTIVE NOTE: SEMI-ANNUAL TECHNICAL REPT. NO. 1, 22  
JUN-31 DEC 70,

JAN 71 80P GRANT, NICHOLAS J. IPELLOUX,  
REGIS M. N. IFLEMINGS, MERTON C. IARGON, ALI  
S. I

CONTRACT: DAHC15-70-C-0283, ARPA ORDER-1608  
PROJ: ARPA-0010

UNCLASSIFIED REPORT

DESCRIPTORS: (\*MARAGING STEELS,  
QUENCHING(COOLING)), (\*NICKEL ALLOYS,  
QUENCHING(COOLING)), (\*POWDER METALLURGY,  
\*QUENCHING(COOLING)), MICROSTRUCTURE,  
MECHANICAL PROPERTIES, HEAT TREATMENT,  
AGING(MATERIALS), FREEZING (U)

IDENTIFIERS: STEEL 300-M, NICKEL ALLOY  
IN100 (U)

THE FIRST RESULTS OF THE PROCESSING OF COARSE METAL  
POWDERS OF MARAGING 300 AND IN 100 ARE REPORTED.

THE EFFECT OF COOLING RATES ON THE DENDRITE  
STRUCTURE OF MARAGING 300 ALLOY HAS BEEN INVESTIGATED  
IN A WIDE RANGE OF COOLING RATES. THE STRUCTURE OF  
ATOMIZED PARTICLES ARE PRESENTED AND THEIR COOLING  
RATES ARE DERIVED FROM THE DENDRITE ARM SPACINGS.  
THE SIZE AND DISTRIBUTION OF INCLUSIONS IN A  
COMMERCIAL 300 GRADE MARAGING HAS BEEN DETERMINED AND  
RELATED TO THE MECHANICAL PROPERTIES (TENSILE AND  
FATIGUE). THE ANALYSIS OF THE STRESS AND STRAIN  
CONDITIONS AROUND AN INCLUSION AS A FUNCTION OF THE  
OVERALL STATE OF STRESS IS BEING INVESTIGATED IN  
ORDER TO DETERMINE THE CRACK INITIATION CRITERIA.  
(AUTHOR) (U)



UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-720 379 11/6  
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

THE MECHANISM OF THE VARIATION IN THE  
ABRASIVE WEAR RESISTANCE OF G13L STEEL  
AFTER HARDENING,

(U)

DEC 70 12P KASHCHEEV, V. N. ISANITSKII,  
K. V. INOVOMEISKII, YU. D. I  
REPT. NO. FTD-MT-24-287-70  
PROJ: AF-7343

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED MACHINE TRANS. OF IZVESTIYA  
VYSSHIKH UCHEBNYKH ZAVEDENII. CHERNAYA  
METALLURGIYA (USSR) V12 N12 P103-105 1969, BY LEE D.  
THOMPSON.

DESCRIPTORS: (STEEL, WEAR RESISTANCE),  
HARDENING, NIOBIUM ALLOYS, USSR  
IDENTIFIERS: TRANSLATIONS

(U)

(U)

THE ASSIGNMENT OF THIS STUDY IS TO EXPLAIN THE  
MECHANISM OF THE EFFECT OF THE HARDENING TEMPERATURE  
ON THE CHANGE IN RESISTANCE TO ABRASIVE FAILURE OF  
G13L ALLOYS OF STANDARD COMPOSITION AND WITH  
ADDITIONS OF NIOBIUM, WHICH IN THE OPTIMUM  
CONCENTRATION (0.3-0.4%) NOTICEABLY IMPROVES  
THEIR ABRASIVE WEAR RESISTANCE BOTH IN THE CAST, AND  
IN THE TEMPERED STATES. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-720 398 11/6 1/3  
ALUMINUM CO OF AMERICA NEW KENSINGTON PA ALCOA RESEARCH  
LABS

INVESTIGATION TO DEVELOP A HIGH STRENGTH  
STRESS-CORROSION RESISTANT NAVAL AIRCRAFT  
ALUMINUM ALLOY.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 16 DEC 69-16 SEP 70,  
NOV 70 114P STALEY, J. T. I  
CONTRACT: N00019-70-C-0118, N00019-69-C-0292

UNCLASSIFIED REPORT

DESCRIPTORS: (\*AIRFRAMES, \*TITANIUM ALLOYS),  
(\*ALUMINUM ALLOYS, NAVAL AIRCRAFT), METAL  
PLATES, CORROSION-RESISTANT ALLOYS, STRESS  
CORROSION, MECHANICAL PROPERTIES, ANODIC  
COATINGS

(U)

THE REPORT PRESENTS THE RESULTS OF AN EVALUATION OF  
THREE TEMPER OF COMMERCIALY FABRICATED ALLOY MA15  
PLATE IN 1 IN. TO 6 IN. THICKNESS. COMPARED AT  
EQUAL STRENGTHS, MA15 DEVELOPED HIGHER RESISTANCE  
TO STRESS-CORROSION CRACKING, GREATER RESISTANCE TO  
EXFOLIATION CORROSION, HIGHER TOUGHNESS, AND BETTER  
FATIGUE PERFORMANCE THAN ESTABLISHED COMMERCIAL  
ALUMINUM ALLOYS. COMPARED AT EQUAL RESISTANCE TO  
STRESS-CORROSION CRACKING, MA15 DEVELOPED  
SUBSTANTIALLY HIGHER STRENGTH THAN ESTABLISHED  
COMMERCIAL ALUMINUM ALLOYS. FIELD TESTING OF THIS  
MATERIAL IS RECOMMENDED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZONCI

AD-721 537 13/5 13/13  
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF NAVAL  
ARCHITECTURE AND MARINE ENGINEERING

INVESTIGATION OF DISTORTION REMOVAL IN WELDED  
STRUCTURES.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
NOV 70 51P WALSH, RICHARD A. DUFFY,  
DAVID K. IMASUBUCHI, KOICHI I  
CONTRACT: DOT-CG-92784-B  
PROJ: CG-793105/002

UNCLASSIFIED REPORT

DESCRIPTORS: (WELDS, ALIGNMENT), HEATING,  
STRUCTURES, DISTORTION, REMOVAL, STEEL,  
FLAMES

(U)

IDENTIFIERS: FLAME STRAIGHTENING, WELDMENTS,  
HIGH STRENGTH STEELS, STEEL CORTEN, STEEL  
1021, STEEL HY-80

(U)

THE OBJECTIVE OF THE STUDY IS TO INVESTIGATE  
MECHANISMS OF FLAME STRAIGHTENING WITH EMPHASIS ON  
ITS EFFECTIVENESS ON HIGH-STRENGTH-STEEL STRUCTURES.  
IN THE PHASE 1 STUDY AN INVESTIGATION WAS MADE OF  
MECHANISMS OF FLAME STRAIGHTENING ON SIMPLE WELDMENTS  
IN LOW-CARBON STEEL AND HY-80 STEEL (QUENCHED AND  
TEMPERED STEEL WITH SPECIFIED MINIMUM YIELD STRENGTH  
OF 80,000 PSI). FLAME STRAIGHTENING WAS TWO TO  
THREE TIMES MORE EFFECTIVE ON LOW-CARBON STEEL  
SPECIMENS THAN ON HY-80 STEEL SPECIMENS. IN THE  
PHASE 2 STUDY AN INVESTIGATION WAS MADE OF  
MECHANISMS OF FLAME STRAIGHTENING ON FRAMED PANEL  
STRUCTURES. THE SPECIMENS WERE MADE IN LOW-CARBON  
STEEL (AISI 1020), LOW-ALLOY HIGH-STRENGTH STEEL  
(U. S. STEEL CORTEN), AND QUENCHED AND  
TEMPERED STEEL (U. S. STEEL T-1). IT WAS  
ALSO FOUND THAT FLAME STRAIGHTENING TECHNIQUES WERE  
MORE EFFECTIVE ON LOW-CARBON STEEL SPECIMENS THAN ON  
HIGH-STRENGTH STEEL SPECIMENS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-722 034 11/6  
RENSSELAER POLYTECHNIC INST TROY N Y MATERIALS DIV

AN ELECTRON MICROPROBE ANALYSIS OF SOLUTE  
SEGREGATION NEAR GRAIN BOUNDARIES IN AN AL-  
ZN-MG ALLOY.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
APR 71 24P SHASTRY, C. R. ; JUDD, G. ;  
REPT. NO. TR-2  
CONTRACT: N00014-67-A-0117-0009

UNCLASSIFIED REPORT

DESCRIPTORS: (ALUMINUM ALLOYS, GRAIN BOUNDARIES),  
STRESS CORROSION, ZINC ALLOYS, MAGNESIUM ALLOYS,  
GRAIN STRUCTURES (METALLURGY)

(U)

THE CONCENTRATION OF ZINC AND MAGNESIUM ACROSS  
GRAIN BOUNDARIES WAS MEASURED BY MEANS OF AN ELECTRON  
PROBE MICROANALYSER FOR AN AL-ZN-MG ALLOY AFTER  
DIFFERENT QUENCHING (BRINE, WATER, OIL AND AIR)  
AND AGING HEAT TREATMENTS (ROOM TEMPERATURE, 165C  
AND 200C). SIGNIFICANT SOLUTE SEGREGATION WAS  
DETECTED IN QUENCHED SPECIMENS AND ALSO IN SPECIMENS  
THAT WERE AGED AT ROOM TEMPERATURE. WHILE NO  
SEGREGATION WAS MEASURED IN SPECIMENS THAT WERE AGED  
AT ELEVATED TEMPERATURES, SOLUTE DEPLETION WAS  
OBSERVED IN A CONSIDERABLE PROPORTION OF THE EXAMINED  
BOUNDARIES. IT WAS CONCLUDED THAT SOLUTE  
SEGREGATION TO GRAIN BOUNDARIES OCCURRED DURING  
QUENCHING AND WAS RELIEVED DURING AGING.  
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-722 622 13/8  
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTESVILLE  
VA

HEAT AND MECHANICAL TREATMENT OF TITANIUM AND  
ITS ALLOYS (CHAPTER 5), (U)

NOV 70 64P BERNSTEIN, M. L. I  
REPT. NO. FSTC-HT-23-492-70

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRANS. OF MONO.  
TERMOMEKHANICHESKAYA OBRABOTKA METALLOV I SPLAVOV,  
MOSCOW, 1968 P1110-1165.

DESCRIPTORS: (\*HEAT TREATMENT, \*TITANIUM ALLOYS),  
DEFORMATION, QUENCHING(COOLING),  
AGING(MATERIALS), MECHANICAL PROPERTIES,  
USSR (U)  
IDENTIFIERS: TRANSLATIONS (U)

THE SUPERIORITY OF TITANIUM ALLOYS FOR USE AS  
CONSTRUCTION MATERIAL IS DISCUSSED AND THE ADVANTAGES  
OF HEAT AND MECHANICAL TREATMENT OF SPECIFIC TITANIUM  
ALLOYS INCLUDING VT3-1, VT8 AND VT14 ARE  
POINTED OUT. CHANGES IN TREATMENT PROCESSES,  
INCLUDING DEGREE OF DEFORMATION, QUENCHING PROCEDURE,  
AGING TIMES AND TEMPERATURES ARE SHOWN TO AFFECT THE  
MECHANICAL PROPERTIES OF TITANIUM ALLOYS. SPECIFIC  
CHANGES IN MECHANICAL PROPERTIES, INCLUDING TENSILE  
STRENGTH, PLASTICITY AND IMPACT TOUGHNESS ARE  
PRESENTED GRAPHICALLY. OPTIMAL TREATMENT CONDITIONS  
ARE DEVELOPED FOR SPECIFIED INCREASES IN STRENGTH AND  
PLASTICITY. THE INVESTIGATION INCLUDES COMPARATIVE  
STUDIES OF THE MICROSTRUCTURES OF ALLOYS SUBJECTED TO  
DIFFERENT MECHANICAL AND HEAT TREATMENTS.  
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-722 730 13/8  
EDGEWOOD ARSENAL MD

VACUUM-BRAZING -- GAS-QUENCHING HISTORY,  
DEVELOPMENT, AND OVERALL PROGRAM.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
JAN 71 190P GURTNER, FRANCIS B. SHUTT,  
PAUL K. , JR. BURROWS, CHARLES F. WERNER, W.  
J. MCCALL, JAMES L. I  
REPT. NO. EA-TR-4482

UNCLASSIFIED REPORT

DESCRIPTORS: (\*BRAZING, METAL JOINTS),  
(\*QUENCHING(COOLING), METAL JOINTS),  
ALUMINUM ALLOYS, STEEL, TITANIUM ALLOYS, BRAZING  
ALLOYS

(U)

IDENTIFIERS: \*VACUUM BRAZING, \*GAS QUENCHING,  
ALUMINUM ALLOY 2014, ALUMINUM ALLOY 2219,  
ALUMINUM ALLOY 6061, STEEL 4130, STEEL 4340,  
STEEL 18 NI, STEEL 316, STEEL 321, TITANIUM  
ALLOY 6AL 4V

(U)

THE VACUUM-BRAZING AND VACUUM-HEAT-TREAT, GAS-  
QUENCHING PROCESS IS A RELIABLE PROCESS FOR  
FABRICATING HARDWARE ITEMS WHERE HELIUM LEAK-TIGHT  
JOINTS ARE REQUIRED. NEW FILLER METALS WERE  
DEVELOPED FOR VACUUM-BRAZING ALUMINUM ALLOYS, AND  
METALLOGRAPHIC EXAMINATION WAS ACCOMPLISHED ON ALL  
METALS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMCI

AD-723 546 11/6 13/8  
FURNACE TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

EFFECT OF INTERMEDIATE ANNEALING ON THE  
TEXTURE OF TRANSFORMER STEEL,

(U)

JAN 71 10P KOCHNOV, V. E. IFOMINYKH, R.  
P. IGERSHMAN, R. B. I  
REPT. NO. FTD-HT-23-897-70  
PROJ: FTD-6010704  
TASK: DIA-T68-01-02

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED TRANS. OF IZVESTIYA  
VYSSHIKH UCHEBNIKH ZAVEDENII. CHERNAYA  
METALLURGIYA (USSR) V12 N4 P101-104 1969, BY D.  
KOOLBECK.

DESCRIPTORS: (\*STEEL, \*ANNEALING), TRANSFORMERS,  
COLD WORKING, GRAIN STRUCTURES(METALLURGY),  
USSR

(U)

IDENTIFIERS: \*ELECTRICAL STEELS, TRANSLATIONS

(U)

THE ARTICLE IS CONCERNED WITH THE QUESTION OF THE  
EFFECT OF INTERMEDIATE ANNEALING CONDITIONS ON THE  
PERFECTION OF THE CRYSTALLOGRAPHIC TEXTURE AFTER THE  
HIGH-TEMPERATURE ANNEALING. EXPERIMENTS WERE  
CONDUCTED WITH COLD-ROLLED SPECIMENS OF TRANSFORMER  
STEEL. CHANGES IN MECHANICAL MOMENT WITH VARIOUS  
ANNEALING CONDITIONS ARE OUTLINED. IT IS  
DETERMINED THAT OTHER CONDITIONS BEING EQUAL,  
INTERMEDIATE ANNEALING TEMPERATURES CAN HAVE AN  
ESSENTIAL INFLUENCE ON THE PERFECTION OF TEXTURE IN  
SHEETS OF TRANSFORMED STEEL.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-723 636 11/6  
AIR FORCE MATERIALS LAB WRIGHT-PATTERSON AFB OHIO

IMPROVED PROPERTIES OF TI-6AL-6V-2SN  
THROUGH MICRO-STRUCTURE MODIFICATION. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT. JAN-AUG 70,  
FEB 71 30P HALL, J. A. PIERCE, C. M.

REPT. NO. AFML-TR-70-312  
PROJ: AF-7351  
TASK: 735105

UNCLASSIFIED REPORT

DESCRIPTORS: (\*TITANIUM ALLOYS, MICROSTRUCTURE),  
FRACTURE(MECHANICS), HEAT TREATMENT, ALUMINUM  
ALLOYS, TIN ALLOYS, VANADIUM ALLOYS, TENSILE  
PROPERTIES (U)  
IDENTIFIERS: TITANIUM ALLOYS 6AL 2SN 6V (U)

THE FRACTURE TOUGHNESS OF THE TI-6AL-6V-2SN  
ALLOY IN THE ANNEALED CONDITION IS GREATLY INFLUENCED  
BY MICROSTRUCTURAL FEATURES WHICH MAY VARY  
CONSIDERABLY AS A RESULT OF DIFFERING THERMAL-  
MECHANICAL PROCESSING OPERATIONS EMPLOYED PRIOR TO  
THE ANNEALING HEAT TREATMENT. THE VARIETY OF  
MICROSTRUCTURES WHICH CAN RESULT MERELY BY HEAT  
TREATMENT IS CATEGORIZED AND THE RELATED TENSILE AND  
TOUGHNESS PROPERTIES ARE PRESENTED. IN INSTANCES  
WHERE HIGHER FRACTURE TOUGHNESS IS DESIRED, JUDICIOUS  
HEAT TREATMENT OF THE AS-RECEIVED MATERIAL CAN OFTEN  
INCREASE THIS PROPERTY. OF THE HEAT TREATMENTS  
EMPLOYED IN THIS INVESTIGATION, THE PROPERTIES WERE  
MOST SIGNIFICANTLY IMPROVED BY SOLUTION TREATING AT  
1710F FOR 80 MINUTES, AIR COOLING, AND SUBSEQUENTLY  
HEATING TO 1400F FOR ONE HOUR FOLLOWED BY AN AIR  
COOL. THE TENSILE STRENGTH OF THE ALLOY WAS  
INCREASED FROM 150 TO 155.6 KSI AND THE FRACTURE  
TOUGHNESS (K SUB Q) WAS RAISED FROM 55.8 TO 68.0  
KSI SQ IN. (AUTHOR) (U)



UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-723 990 11/6  
CASE WESTERN RESERVE UNIV CLEVELAND OHIO DIV OF  
METALLURGY AND MATERIALS SCIENCE

MICROSTRUCTURAL-MECHANICAL PROPERTY  
RELATIONSHIPS IN HIGH STRENGTH CAST  
STEELS.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 21 JUN 69-31 MAY 70,  
DEC 70 79P SULLY, LIONEL J. D. I

WALLACE, JOHN F. I

CONTRACT: DAAG46-68-C-0052

PROJ: DA-586332

MONITOR: AMMRC CR-69-12(F)

UNCLASSIFIED REPORT

DESCRIPTORS: (\*STEEL, CASTINGS), METAL PLATES,  
DENDRITIC STRUCTURE, MICROSTRUCTURE, MECHANICAL  
PROPERTIES, HEAT TRANSFER  
IDENTIFIERS: \*STEEL CASTINGS

(U)

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THE INFLUENCE OF DIFFERENT TYPES OF CHILL MATERIALS  
PLACED UNDER THE ENTIRE BOTTOM SURFACE OF 20 IN. X 20  
IN. X 5-1/2 IN. THICK AISI 4335 TYPE CAST STEEL  
PLATES ON THE RATE OF REMOVAL OF HEAT FROM THE  
SOLIDIFYING CASTING WAS DETERMINED. THE EFFECTS  
THAT THESE CHILLS EXERTED ON THE METALLOGRAPHIC  
STRUCTURE AND MECHANICAL PROPERTIES AFTER QUENCHING  
AND TEMPERING TO HIGH STRENGTH WERE DETERMINED.  
THE RESULTS OBTAINED WITH THESE CHILLED 20 IN. X 20  
IN. X 5-1/2 IN. PLATES WERE COMPARED TO BOTTOM  
CHILLED 60 IN. X 48 IN. X 4 TO 6 IN. THICK PLATES  
CAST BY TWO COOPERATING COMMERCIAL FOUNDRIES. IT  
WAS DETERMINED THAT THE RATE OF HEAT TRANSFER INTO A  
BOTTOM CHILL INCREASES SOMEWHAT DURING THE POUR TO A  
RELATIVELY HIGH VALUE BUT THEN DECREASES SHARPLY TO A  
CONSTANT VALUE OF ABOUT 75 PLUS OR MINUS 5 BTU/HR-  
FT<sup>2</sup> ABOUT 3 MINUTES AFTER THE POUR FOR ALL CHILL  
MATERIALS TESTED. THIS DECREASE IN HEAT TRANSFER  
OCCURS BECAUSE OF A GAP FORMATION AT THE CASTING-  
CHILL INTERFACE. WATER COOLED COPPER WAS THE MOST  
EFFECTIVE CHILL MATERIAL BECAUSE OF ITS HIGHER HEAT  
DIFFUSIVITY. THE SECONDARY DENDRITE ARM SPACING IN  
THE STEEL CASTINGS ARE REFINED BY THE STEEPER THERMAL  
GRADIENTS ACCOMPANYING THE FASTER RATE OF HEAT  
REMOVED. (AUTHOR)

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UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-726 582 11/6  
RUTGERS - THE STATE UNIV NEW BRUNSWICK N J MATERIALS  
RESEARCH LAB

FATIGUE STUDY OF QUENCHED AL-6.5 AT 8 ZN  
ALLOY.

(U)

DESCRIPTIVE NOTE: SUMMARY REPT. 1 JUL 70-31 JAN 71,  
MAY 71 27P WEISSMANN, S. IKIRITANI, M. I  
CONTRACT: F33615-70-C-1240  
PROJ: AF-7353  
TASK: 735301  
MONITOR: AFML TR-71-68

UNCLASSIFIED REPORT

DESCRIPTORS: (ALUMINUM ALLOYS,  
FATIGUE(MECHANICS)), ZINC ALLOYS,  
MICROSTRUCTURE, GRAIN STRUCTURES(METALLURGY),  
DISLOCATIONS, QUENCHING(COOLING)  
IDENTIFIERS: ALUMINUM ALLOY 6.5 ZN

(U)  
(U)

THE DEFECT STRUCTURE OF AN AL-6.5 AT 8 ZN  
ALLOY INDUCED BY QUENCHING AND LOW-TEMPERATURE AGING  
(-80 TO +60C) AND THE EFFECTS OF FATIGUE  
CYCLING WERE INVESTIGATED. THE DEFECT STRUCTURE  
UPON QUENCHING CONSISTED OF HOMOGENEOUSLY NUCLEATED  
DISLOCATION LOOPS, HELICAL DISLOCATIONS DEVELOPED  
FROM SCREW DISLOCATIONS, THE LATTER BEING INTRODUCED  
BY TWO DIFFERENT PROCESSES. THE DEFECT STRUCTURE  
ALSO CONTAINED PERFECT LOOPS CONVERTED FROM HELICAL  
DISLOCATIONS AND FAULTED DISLOCATION LOOPS WHOSE  
NUCLEATION WAS ENHANCED BY VACANCIES GENERATED BY  
QUENCH DEFORMATION. BASED ON EXPERIMENTAL  
EVIDENCE, A MODEL IS PRESENTED EXPLAINING THE  
FORMATION OF A ROW OF PERFECT DISLOCATION LOOPS FROM  
A SINGLE HELICAL DISLOCATION. THE INTERRELATION OF  
THE VARIOUS TYPES OF INDUCED DEFECTS IS SHOWN BY  
CORRELATING THEIR FORMATION WITH THE AID OF VACANCY  
MECHANISMS. THE ABSENCE OF A DELINEATED CELL  
STRUCTURE IN THE FATIGUE-CYCLED SPECIMENS AND THE  
HOMOGENEOUS DISTRIBUTION OF THE DISLOCATIONS WITHIN  
THE GRAIN WERE ATTRIBUTED TO THE BARRIER EFFECT OF  
THE QUENCH-INDUCED DISLOCATION LOOPS PINNED BY  
PRECIPITATES. THIS BARRIER EFFECT ALSO GAVE RISE  
TO A LARGE ACCUMULATION OF DISLOCATIONS AT GRAIN  
BOUNDARIES INDUCED BY CYCLING. THE ACCUMULATION OF  
DISLOCATIONS AT THE GRAIN BOUNDARIES APPEARED TO  
PROVIDE THE DRIVING FORCE FOR FATIGUE-INDUCED  
BOUNDARY MIGRATION. THE LATTER FACILITATED  
PRECIPITATION OF ZINC-RICH PARTICLES.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-726 758 13/8  
ARCOS CORP PHILADELPHIA PA

DEVELOPING A HEAT-TREATABLE HY-80 WELDING  
ELECTRODE.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,  
JUN 71 48P CAMPBELL, HALLOCK C. I  
CONTRACT: NOBS-92490  
PROJ: SR007-01-01  
TASK: 2832

UNCLASSIFIED REPORT

DESCRIPTORS: (WELDING RODS, STEEL), HEAT  
TREATMENT, WELDS  
IDENTIFIERS: STEEL HY-80

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(U)

A HEAT-TREATABLE LOW HYDROGEN ELECTRODE OF MIL-  
8218 CLASSIFICATION WAS DEVELOPED, SUITABLE FOR WELDS  
IN 5-INCH THICK HY-80 STEEL TO BE QUENCHED AND  
TEMPERED AFTER WELDING. THE ELECTRODE DEPOSITS WELD  
METAL WITH CHEMICAL COMPOSITION SLIGHTLY OVERMATCHING  
THE COMPOSITION OF HY-80 STEEL. THE ELECTRODE  
COATING IS SIMILAR TO THAT OF EXISTING ARCOS  
'DUCTILEND' ELECTRODES WHICH ENJOY WELDER  
ACCEPTANCE IN SHIPYARDS AND FABRICATING PLANTS  
THROUGHOUT THE COUNTRY. SAMPLES OF THE ELECTRODE  
HAVE SUCCESSFULLY BEEN USED TO WELD HY-80 FORGINGS  
5-1/2 INCHES THICK WITHOUT ENTRAPMENT OF SLAG, OR  
EVIDENCE OF CRACKING OR POROSITY. OPERATION OF THE  
ELECTRODE IS SATISFACTORY IN ALL POSITIONS.  
(AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-726 952 11/6 19/6  
WATERVLIET ARSENAL N Y

THE ELEVATED TEMPERATURE PROPERTIES OF TWO  
81MM MORTAR TUBE ALLOYS 4337M AND 4140.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
JUN 71 57P DEFRIES, RICHARD S. I  
REPT. NO. WVT-7106

UNCLASSIFIED REPORT

DESCRIPTORS: (\*STEEL, GUN BARRELS), MORTARS,  
MECHANICAL PROPERTIES, TEMPERATURE  
IDENTIFIERS: STEEL 4337, STEEL 4140, \*MORTAR  
TUBES

(U)

(U)

AN EVALUATION WAS MADE OF THE EFFECT OF ROOM AND  
ELEVATED TEMPERATURES (800 TO 1200F) AND TIMES AT  
THESE TEMPERATURES (0 TO 30 HOURS) ON THE  
MECHANICAL PROPERTIES OF TWO MORTAR TUBE ALLOYS,  
AISI 4140 AND AISI 4337 MODIFIED, QUENCHED AND  
TEMPERED TO FOUR STRENGTH LEVELS. THE ELEVATED  
TEMPERATURE YIELD STRENGTH AND DUCTILITY AFTER  
EXPOSURE TO THE VARIOUS TEMPERATURES FOR VARIOUS  
TIMES ARE DISCUSSED. THE ROOM TEMPERATURE YIELD  
STRENGTH AND -40F IMPACT ENERGY AFTER EXPOSURE TO  
VARIOUS TEMPERATURES FOR VARIOUS TIMES ARE ALSO  
DISCUSSED. RESULTS OF THE ELEVATED TEMPERATURE  
TENSILE TESTING OF THE TWO ALLOYS SHOWED THAT THE  
YIELD STRENGTH DECREASES RAPIDLY WITH HIGH  
TEMPERATURES. THE DUCTILITY (%RA) INCREASES WITH  
INCREASING TEMPERATURE AND REMAINS FAIRLY CONSTANT  
WITH TIME AT TEMPERATURE. THE ROOM TEMPERATURE  
YIELD STRENGTH DECREASES WITH TIME AFTER EXPOSURE AT  
TEMPERATURES ABOVE THE TEMPERING TEMPERATURE OF THE  
ALLOY. THE -40F CHARPY V-NOTCH IMPACT  
STRENGTH INCREASES AFTER EXPOSURE AT TEMPERATURES  
HIGHER THAN THE TEMPERING TEMPERATURE OF THE ALLOY.  
INCREASING THE ROOM TEMPERATURE YIELD STRENGTH  
(BY LOWERING THE TEMPERING TEMPERATURE) DOES NOT  
SIGNIFICANTLY INCREASE THE ELEVATED TEMPERATURE YIELD  
STRENGTH OF THE ALLOY. (AUTHOR)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMCI

AD-727 872 13/5 11/6  
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

CREEP LIMIT AND STRUCTURAL STABILITY OF THE  
PARENT METAL AND WELD JOINTS MADE FROM  
IMPROVED LOW-ALLOY HEAT-RESISTING STEEL  
12MKH AND 12KH1MF.

(U)

JUN 71 16P KUZMAK, E. M. IKROSHKIN, V.  
A. ;  
REPT. NO. FTD-MT-24-130-71  
PROJ: FTD-60108  
TASK: DIA-T65-01-82, DIA-T65-01-83

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED MACHINE TRANS. OF INSTITUT  
NEFTEKHIMICHESKOI I GAZOVOI PROMYSHLENNOSTI, MOSCOW.  
TRUDY (USSR) N70 P84-90 1967, BY ROBERT WALLACE.

DESCRIPTORS: (WELDS, STEEL), HEAT-RESISTANT  
METALS + ALLOYS, STRUCTURAL PROPERTIES, MECHANICAL  
PROPERTIES, STABILITY, USSR  
IDENTIFIERS: TRANSLATIONS

(U)  
(U)

THE STEELS 12MKH AND 12KH1MF ARE WIDELY USED  
TO FABRICATE EQUIPMENT AND PIPE OPERATING AT  
TEMPERATURES OF UP TO 540 AND 560 DEGREES CENTIGRADE,  
RESPECTIVELY. PRELIMINARY TESTS OF THESE STEELS  
ESTABLISHED THAT THE OPTIMAL REGIME OF IMPROVING  
THEIR QUALITIES AND WELDING (SUCH AS WOULD ASSURE A  
WELDED JOINT OF THE SAME STRENGTH AS THE BASE METAL  
AT NORMAL AND ELEVATED TEMPERATURES DURING SHORT-TIME  
TESTS) IS AS FOLLOWS: FOR 12MKH STEEL: WATER  
QUENCHING FROM 930 DEGREES CENTIGRADE; TEMPERING AT  
680 DEGREES CENTIGRADE FOR 2 HR; RUNNING ENERGY OF  
WELDING 2500-4500 CAL/CM; FOR 12KH1MF STEEL,  
WATER QUENCHING FROM 980 DEGREES CENTIGRADE; TEMPERING  
AT 750 DEGREES CENTIGRADE FOR 3 HR; RUNNING ENERGY OF  
WELDING 4000-6000 CAL/CM. 12MKH STEEL IS BEST  
POSTHEATED AT 630 DEGREES CENTIGRADE AND 12KH1MF  
STEEL, AT 700 DEGREES CENTIGRADE. THE HIGH  
TEMPERATURE STRENGTH OF THESE STEELS AND OF THEIR  
WELDED JOINTS, AS DETERMINED BY TENSILE STRESS-  
RUPTURE TESTS WAS FOUND TO BE GREATER FOR THE STEELS  
IN IMPROVED STATE. HOWEVER, IN TIME THE EFFECT  
PRODUCED BY THIS IMPROVEMENT GRADUALLY DIMINISHES AND  
ON EXTRAPOLATION TO 100,000 HR OF NORMAL OPERATION  
THIS EFFECT COMPLETELY DISAPPEARS. ON THE OTHER  
HAND, IF THE STEELS ARE TESTED AT APPROXIMATELY 520  
DEGREES CENTIGRADE THIS BENEFICIAL EFFECT OF HEAT  
TREATMENT PERSISTS. (AUTHOR)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-728 239 11/6  
MIDWEST RESEARCH INST KANSAS CITY MO

MECHANISMS OF FATIGUE IN MILL-ANNEALED TI-6AL-4V AT ROOM TEMPERATURE AND 600F. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT. 1 APR 70-28 FEB 71.  
APR 71 SIP BENSON, DAVID K. I  
GROSSKREUTZ, J. CHARLES ISHAW, GORDON G. I  
CONTRACT: F33615-70-C-1284, F33615-67-C-1547  
PROJ: AF-7353  
TASK: 735303  
MONITOR: AFML TR-71-81

UNCLASSIFIED REPORT

DESCRIPTORS: (TITANIUM ALLOYS,  
FATIGUE(MECHANICS)), ALUMINUM ALLOYS, VANADIUM  
ALLOYS, CRACK PROPAGATION, CRACKS (U)  
IDENTIFIERS: TITANIUM ALLOY 6AL4V (U)

THE MECHANISMS OF THE FATIGUE OF MILL-ANNEALED TI-6AL-4V WERE STUDIED AT 600F AND ROOM TEMPERATURE. EARLY CRACK INITIATION (IN SUB 0 APPROXIMATELY  $\approx$  OR  $<$  0.14 NF) WAS FOUND TO OCCUR IN HCP ALPHA-GRAINS BY A SLIP-BAND MECHANISM UNDER ALL BUT THE LEAST SEVERE CONDITIONS OF CYCLIC STRESS. UNDER STRESSES NEAR THE FATIGUE LIMIT AT ROOM TEMPERATURE, FATIGUE CRACKS BEGAN MUCH LATER (NO APPROXIMATELY 0.4 NF) AT THE INTERFACE BETWEEN HCP ALPHA- AND BCC BETA-GRAINS WITHOUT DETECTABLE SLIP. UNDER ALL CONDITIONS, STAGE 1 FATIGUE CRACK GROWTH OCCUPIED 50-80% OF THE TOTAL LIFE. ALTHOUGH MECHANICAL TWINS WERE PRODUCED IN PROFUSION NEAR THE GROWING STAGE 2 FATIGUE CRACKS, THEY APPEARED TO PLAY NO ROLE IN CRACK INITIATION OR STAGE 1 CRACK GROWTH; NOR DID THEY FACILITATE STAGE 2 GROWTH. A VERY THIN POLYGONIZED LAYER (APPROXIMATELY 1 MICROMETER THICK) WAS DISCOVERED ADJACENT TO THE STAGE 2 FATIGUE CRACK SURFACES. NEITHER THIS NOR ANY OTHER OF THE OBSERVATIONS COULD BE INTERPRETED AS EVIDENCE FOR A METALLURGICAL INSTABILITY OR STRAIN-INDUCED PHASE TRANSFORMATION WHICH MIGHT BE HARMFUL TO THE FATIGUE RESISTANCE OF THE ALLOY. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-728 654 11/6  
DAYTON UNIV OHIO RESEARCH INST

AN INVESTIGATION OF VERY-HIGH-SPEED-DROP-  
IMPINGEMENT EROSION OF 1100 ALUMINUM.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
MAY 71 48P ENGEL, OLIVE G. I  
CONTRACT: F33615-69-C-1385  
PROJ: AF-7340  
TASK: 734007  
MONITOR: AFML TR-71-104

UNCLASSIFIED REPORT

DESCRIPTORS: (\*ALUMINUM ALLOYS, WATER  
IMPINGEMENT), EROSION, RAINDROPS

(U)

AN INVESTIGATION OF FIVE AVAILABLE SPECIMENS OF 1100-O ALUMINUM, WHICH WERE TESTED UNDER WATERDROP IMPINGEMENT AT VELOCITIES FROM MACH 1.5 TO MACH 4, WAS UNDERTAKEN TO DETERMINE THE MECHANISM OF EROSION OF ALUMINUM AT VERY HIGH VELOCITIES. THE RESULTS OF INSPECTION OF THE ERODED SPECIMENS WITH USE OF A LIGHT MICROSCOPE AND SCANNING ELECTRON MICROSCOPE REVEALED THAT PLASTIC FLOW OF THE ALUMINUM INCREASED AS THE TEST VELOCITY INCREASED. CROSS-SECTIONAL CUTS OF THE SPECIMENS REVEALED A SMALL AMOUNT OF WORK-HARDENING AT VELOCITIES OF MACH 2.5 AND ABOVE, BUT NO EVIDENCE OF CRACK FORMATION WAS FOUND. THESE FINDINGS ARE COMPATIBLE IF THE HEAT GENERATED BY THE AMOUNT OF PLASTIC FLOW OF ALUMINUM THAT OCCURS IS LARGE ENOUGH TO ANNEAL THE WORKED METAL. IF THIS IS THE CASE, ALUMINUM IS A PERMANENTLY PLASTIC MATERIAL. TWO MECHANISMS OF METAL REMOVAL ARE CONSIDERED. THE FIRST, WHICH IS APPLICABLE AT VELOCITIES UP TO MACH 2.5, IS THE BREAKING OFF OF PROTUBERANCES FORMED BY PLASTIC FLOW OF THE METAL. THE SECOND, WHICH IS APPLICABLE AT VELOCITIES ABOVE MACH 2.5, IS THE EXTRUSION OF SEPARATE MASSES OF METAL WHICH HAVE BECOME SURROUNDED BY SURFACES OF DISCONTINUITY AS A RESULT OF THE PUMMELING EFFECT OF THE INDIVIDUAL WATERDROP BLOWS. THE SECOND MECHANISM OF METAL LOSS CAN BE EXPECTED TO PROGRESS AS A LAYER-REMOVAL PROCESS.

(AUTHOR)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-729 039 13/8  
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

COMPARATIVE WEAR RESISTANCE OF DIFFUSION  
LAYERS,

(U)

JUN 71 13P VOROSHIN, L. G. ILYAKHOVICH,  
L. S. IFUNSHTEIN, YA. N. I  
REPT. NO. FTD-MT-24-44-71  
PROJ: AF-7343

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED MACHINE TRANS. FROM KHIMIKO-  
TERMICHESKAYA OBRABOTKA STALI I SPLAVOV (USSR)  
P138-141 1969, BY ROBERT ALLEN POTTS.

DESCRIPTORS: (\*CASE HARDENING, \*STEEL), WEAR  
RESISTANCE, QUENCHING(COOLING), DIFFUSION,  
FRICTION, USSR

(U)

IDENTIFIERS: TRANSLATIONS

(U)

STEELS 20, 25, 45 AND 25KHGT, AFTER SURFACE  
HARDENING BY VARIOUS DIFFUSION METHODS, WERE  
SUBJECTED TO ABRASIVE WEAR TESTS. THE HIGHEST  
RESISTANCE TO WEAR IN ROLLING FRICTION WAS OBSERVED  
AFTER HOLDING 2 HR IN A GIVEN MELT CONTAINING 3 PERCENT  
OF A GIVEN COMPOSITION AT 850 DEGREES, FOLLOWED BY  
IMMEDIATE QUENCHING IN WATER OR OIL; GAS CARBURIZING  
(IN NATURAL OR SYNTHETIC GAS), HIGH TEMPERATURE  
CYANIDING (IN A GIVEN MOLTEN MIXTURE AT 920  
DEGREES), AND NITROCARBURIZING (IN A MIXTURE OF  
AMMONIA AND KEROSENE AT 880 DEGREES) PRODUCED  
SURFACES OF LOWER WEAR RESISTANCE. THE HIGHEST  
RESISTANCE IN SLIDING FRICTION WAS OBTAINED IN THE  
CASE OF STEEL 45 AFTER BORONIZING FOR 5 HR IN A GIVEN  
MELT AT 980-1000 DEGREES, IMMEDIATELY FOLLOWED BY  
QUENCHING IN OIL AND TEMPERING FOR 90 MIN AT 250  
DEGREES; BORONIZING IN A GIVEN MELT RESULTED IN  
SOMEWHAT LOWER WEAR RESISTANCE, BUT THE WEAR  
RESISTANCE OF ALL BORONIZED STEEL 45 SAMPLES WAS  
STILL MUCH HIGHER THAN THAT OF STEELS 20 AND 25  
KHGT AFTER ANY OF THE ABOVE MENTIONED CARBURIZING  
TREATMENTS.

(U)



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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-732 028 11/6  
SOUTHWEST RESEARCH INST SAN ANTONIO TEX DEPT OF STRUCTURAL  
RESEARCH

THE EFFECT OF RESIDUAL STRESS ON CRACK  
PROPAGATION IN HY-80 STEELS. (U)

DESCRIPTIVE NOTE: INTERIM REPT.,  
OCT 71 19P SHERMAN, ROBERT ;  
CONTRACT: N00014-70-C-0265  
PROJ: SWRI-03-2801

UNCLASSIFIED REPORT

DESCRIPTORS: (\*STEEL, \*CRACK PROPAGATION),  
STRESSES, FATIGUE(MECHANICS),  
FRACTURE(MECHANICS) (U)  
IDENTIFIERS: RESIDUAL STRESS, STEEL HY-80 (U)

TESTS WERE CONDUCTED TO DETERMINE THE EFFECT OF  
RESIDUAL STRESS ON THE RATE OF CRACK GROWTH IN HY-  
80 PLATE STEEL. A RESIDUAL STRESS FIELD, OVER AND  
ABOVE THAT INHERENTLY PRESENT IN AS-QUENCHED AND  
TEMPERED MATERIAL, WAS INDUCED BY MEANS OF WELDING-IN  
OF A PRE-CRACKED PATCH PLATE INTO THE SPECIMEN BODY.  
A CYCLIC LOAD, WHICH WOULD INDUCE PARTICULAR VALUES  
OF STRESS INTENSITY, WAS THEN APPLIED. FROM THE  
ENSUEING TEST RESULTS, A GROWTH RATE RELATION WAS  
DETERMINED AND COMPARED TO A SIMILAR RELATION  
OBTAINED FROM LIKE TESTS PERFORMED ON SPECIMENS  
HAVING ZERO WELD-INDUCED RESIDUAL STRESS.  
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-733 068 11/6  
NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER BETHESDA  
MD

EFFECTS OF MICROSTRUCTURE, COMPOSITION, AND  
STRENGTH ON THE STRENGTH-DIFFERENTIAL  
PHENOMENON OBSERVED IN HY-80 STEEL.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,  
OCT 71 SIP SALIVE, MARCEL L. WILLNER,  
ABNER R. I  
REPT. NO. NSRDC-3701  
PROJ: SF35-422-212

UNCLASSIFIED REPORT

DESCRIPTORS: (STEEL, MECHANICAL PROPERTIES),  
MICROSTRUCTURE, NICKEL ALLOYS, CHROMIUM ALLOYS,  
MOLYBDENUM ALLOYS, TENSILE PROPERTIES, COMPRESSIVE  
PROPERTIES, HEAT TREATMENT, COMPUTER PROGRAMS  
IDENTIFIERS: STEEL HY-80

(U)

(U)

STEEL FROM 22 HEATS OF LOW-CARBON NI-CR-MO  
STEEL (MIL-S-16216G AND ASTM A543-65)  
WERE HEAT TREATED TO STUDY THE EFFECTS ON THE  
STRENGTH-DIFFERENTIAL EFFECT AND THE DIFFERENCE  
BETWEEN TENSILE AND COMPRESSIVE YIELD STRENGTH OF  
(1) COMMERCIAL VARIATION IN COMPOSITION AND  
INCLUSION CONTENT, (2) VARIATION IN  
MICROSTRUCTURE SUCH AS PRIOR AUSTENITIC GRAIN SIZE  
AND THE RELATIVE AMOUNT OF ISOTHERMALLY PRODUCED  
FERRITE OR BAINITE IN A TEMPERED MARTENSITIC MATRIX,  
AND (3) THE OBSERVED VARIATION IN STRENGTH  
OBTAINED AFTER A 1-HOUR 1150 F TEMPER FOLLOWED BY A  
WATER QUENCH TO PREVENT EMBRITTLEMENT WHILE COOLING  
FROM THE TEMPERING TEMPERATURE. THE DIFFERENCE  
BETWEEN THE TENSILE AND COMPRESSIVE YIELD STRENGTH,  
SOMETIMES CALLED THE STRENGTH DIFFERENTIAL (S-D)  
EFFECT, WAS OBSERVED IN THIS STUDY TO BE AT LEAST 5  
PERCENT OF THE TENSILE YIELD STRENGTH. DATA ARE  
CITED TO SHOW THAT IN THE LOW-CARBON NI-CR-MO  
STEELS STUDIED HERE, THE S-D EFFECT OBSERVED WAS  
A RELATIVELY CONSTANT PERCENT OF THE TENSILE YIELD  
STRENGTH, AND WAS MARKEDLY STRUCTURE-SENSITIVE TO  
PRIOR AUSTENITIC GRAIN SIZE, MICROSTRUCTURAL  
CONSTITUENTS, TEMPERING TEMPERATURE, TYPE AND  
DISTRIBUTION OF CARBIDES FORMED DURING TEMPERING, AND  
TEMPERING SLIGHTLY ABOVE THE LOWER CRITICAL  
TEMPERATURE. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-733 335 11/6  
AEROSPACE CORP EL SEGUNDO CALIF LAB OPERATIONS

THE EFFECT OF MICROSTRUCTURE ON FATIGUE  
CRACK PROPAGATION IN TI-6AL-6V-2SN  
ALLOY.

(U)

DESCRIPTIVE NOTE: REPT. FOR SEP 70-JUN 71,  
OCT 71 43P AMATEAU, MAURICE F. HANNA,  
W. DAVE KENDALL, E. GEORGE I  
REPT. NO. TR-0172(2250-10)-3  
CONTRACT: F04701-71-C-0172  
MONITOR: SAMSO TR-71-268

UNCLASSIFIED REPORT

DESCRIPTORS: (\*TITANIUM ALLOYS, CRACK  
PROPAGATION), MICROSTRUCTURE,  
FATIGUE(MECHANICS), FRACTOGRAPHY, ALUMINUM  
ALLOYS, TIN ALLOYS, VANADIUM ALLOYS  
IDENTIFIERS: TITANIUM ALLOY 6AL 2SN 6V

(U)  
(U)

THE FATIGUE CRACK GROWTH BEHAVIOR OF TI-6AL-  
6V-2SN WAS INVESTIGATED FOR FIVE DIFFERENT  
MICROSTRUCTURES, USING CONTOURED DOUBLE-CANTILEVER  
BEAM SPECIMENS. THE FATIGUE CRACK GROWTH BEHAVIOR  
WAS COMPARED WITH THE MECHANICAL STRENGTH, TOUGHNESS,  
AND DUCTILITY PROPERTIES FOR EACH MICROSTRUCTURE.  
THE FATIGUE FRACTURE SURFACES WERE EXAMINED WITH A  
SCANNING ELECTRON MICROSCOPE. ANNEALED STRUCTURES  
CONSISTING OF EQUIAXED PRIMARY ALPHA HAVE THE LOWEST  
CRACK GROWTH RESISTANCE, WHILE THE ACICULAR ALPHA  
MICROSTRUCTURE RESULTING FROM BETA ANNEALING HAS A  
GROWTH RESISTANCE FOUR TIMES GREATER IN THE  
INTERMEDIATE GROWTH REGIME. NO SIMPLE MODEL OF  
CRACK GROWTH RATE USING GROSS MECHANICAL PROPERTIES  
DESCRIBES THE RELATIVE MAGNITUDE NOR THE RELATIVE  
ORDER OF CRACK RESISTANCE AMONG THE DIFFERENT  
MICROSTRUCTURES. (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-734 116 11/6  
BATTELLE MEMORIAL INST COLUMBUS OHIO DEFENSE METALS  
INFORMATION CENTER

REVIEW OF RECENT DEVELOPMENTS. MECHANICAL  
PROPERTIES OF METALS,

(U)

NOV 71 6P CAMPBELL, J. E. 1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*STEEL, MECHANICAL PROPERTIES),  
(\*ALUMINUM ALLOYS, MECHANICAL PROPERTIES),  
(\*TITANIUM ALLOYS, MECHANICAL PROPERTIES),  
REVIEWS, CRACK PROPAGATION, METALS

(U)

IDENTIFIERS: STEEL 4140, STEEL 4337, STEEL 5CR  
3MO 12NI, TITANIUM ALLOY 6AL 4V, ALUMINUM  
ALLOY 2024, TITANIUM ALLOY 6AL 2SN 6V,  
ANNOUNCEMENT BULLETINS

(U)

!CONTENTS: ELEVATED-TEMPERATURE TENSILE  
PROPERTIES OF AISI 4140 AND 4337A ALLOY STEELS!  
ELEVATED-TEMPERATURE PROPERTIES OF 12 NI MARAGING  
STEEL PLATE AND WELDS! FATIGUE PROPERTIES OF MILL-  
ANNEALED TI-6AL-4V ALLOY AT ROOM TEMPERATURE  
AND 600F! COMPARISON OF FATIGUE-CRACK-GROWTH  
RATES IN ALUMINUM ALLOYS, TITANIUM ALLOYS, AND ALLOY  
STEELS! FRACTURE TOUGHNESS AND FLAW GROWTH IN D6  
ALLOY STEEL.

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UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-734 617 11/6  
RENSSELAER POLYTECHNIC INST TROY N Y MATERIALS DIV

A STUDY OF GRAIN BOUNDARY PRECIPITATE-FREE  
ZONE FORMATION IN AN AL-ZN-MG ALLOY. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
MAY 71 8P SHAstry, C. R. JUDD, GARY I  
REPT. NO. TR-3  
CONTRACT: N00014-67-A-0117-0009  
PROJ: NR-031-737

UNCLASSIFIED REPORT  
AVAILABILITY: PUB. IN METALLURGICAL  
TRANSACTIONS, V2 P3283-3287 DEC 71.

DESCRIPTORS: (\*ALUMINUM ALLOYS, CHEMICAL  
PRECIPITATION), (\*GRAIN BOUNDARIES, CHEMICAL  
PRECIPITATION), HEAT TREATMENT, ZINC ALLOYS,  
MAGNESIUM ALLOYS, ELECTRON MICROSCOPY (U)  
IDENTIFIERS: TRANSMISSION ELECTRON MICROSCOPY (U)

THE EFFECT OF QUENCH RATE BOUNDARY TYPE ON THE  
WIDTH OF PRECIPITATE - FREE ZONES IN AN AL-6.86 WT  
PCT ZN-2.35 WT PCT MG ALLOY THAT WAS AGED AT TWO  
DIFFERENT TEMPERATURES WAS STUDIED BY TRANSMISSION  
ELECTRON MICROSCOPY. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-735 314 11/6  
ARMY MATERIALS AND MECHANICS RESEARCH CENTER WATERTOWN  
MASS

FACTORS INFLUENCING THE STRENGTH DIFFERENTIAL  
OF HIGH STRENGTH STEELS.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
NOV 71 22P CHAIT, RICHARD I  
REPT. NO. AMMRC-TR-71-48  
PROJ: DA-1-T-061101-A-91-A

UNCLASSIFIED REPORT

DESCRIPTORS: (\*STEEL, METALLOGRAPHY),  
MICROSTRUCTURE, COMPRESSIVE PROPERTIES, TENSILE  
PROPERTIES

(U)

IDENTIFIERS: \*HIGH STRENGTH STEELS, STEEL 4340,  
STEEL 410, STEEL H-11, STEEL 18 NI

(U)

ROOM TEMPERATURE TENSILE AND COMPRESSIVE TRUE  
STRESS-TRUE STRAIN CURVES OF VARIOUS HIGH STRENGTH  
STEELS (QUENCHED AND TEMPERED 4340 STEEL, 410  
MARTENSITIC STAINLESS STEEL AND H-11 STEEL AND  
AGED 300-GRADE 18 NI MARAGING STEEL) WERE  
ANALYZED TO DETERMINE THE EFFECT OF THE VARIOUS  
MICROSTRUCTURES ON WHAT HAS BEEN TERMED THE STRENGTH  
DIFFERENTIAL (SD), I.E., THE STRENGTH LEVEL  
DIFFERENCE BETWEEN THE TENSILE AND COMPRESSIVE FLOW  
CURVES. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-737 640 11/6  
NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER BETHESDA  
MD

EFFECTS OF MICROSTRUCTURE, COMPOSITION, AND  
STRENGTH ON THE NIL DUCTILITY TRANSITION  
(NDT) TEMPERATURE OF HY-80 STEEL.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,  
JAN 72 131P SALIVE, MARCEL L. ;  
REPT. NO. NSRDC-3722  
PROJ: SF35.422.212

UNCLASSIFIED REPORT

DESCRIPTORS: (\*STEEL, TRANSITION TEMPERATURE),  
DUCTILITY, MICROSTRUCTURE, GRAIN SIZE, TENSILE  
PROPERTIES

(U)

IDENTIFIERS: STEEL HY-80

(U)

STEEL FROM 22 HEATS OF LOW-CARBON NI-CR-MO  
STEEL, HY-80 (ASTM A543065, AND MIL-S-16216G  
(SHIPS)) WAS HEAT TREATED TO STUDY THE EFFECTS ON  
THE DROP WEIGHT NIL DUCTILITY TRANSITION (NDT)  
TEMPERATURE OF (1) COMMERCIAL VARIATION IN  
COMPOSITION AND INCLUSION CONTENT, (2) VARIATION  
IN MICROSTRUCTURE SUCH AS PRIOR AUSTENITIC GRAIN SIZE  
AND THE RELATIVE AMOUNT OF ISOTHERMALLY PRODUCED  
FERRITE OR BAINITE IN A TEMPERED MARTENSITIC MATRIX,  
AND (3) THE OBSERVED VARIATION IN STRENGTH  
OBTAINED AFTER A ONE-HOUR 1150 F TEMPER FOLLOWED BY  
WATER QUENCH TO PREVENT EMBRITTLEMENT WHILE COOLING  
FROM THE TEMPERING TEMPERATURE. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-739 340 11/6 13/8  
MASSACHUSETTS INST OF TECH CAMBRIDGE CENTER FOR MATERIALS  
SCIENCE AND ENGINEERING

STRUCTURE AND PROPERTY CONTROL THROUGH RAPID  
QUENCHING OF LIQUID METALS. (U)

DESCRIPTIVE NOTE: SEMI-ANNUAL TECHNICAL REPT. NO. 3, 1  
JUL-31 DEC 71,  
JAN 72 130P GRANT, NICHOLAS J. IPELLOUX,  
REGIS M. N. FLEMINGS, MERTON C. IARGON, ALI  
S. I

CONTRACT: DAHC15-70-C-0283, ARPA ORDER-1608  
PROJ: ARPA-0D10

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO SEMI-ANNUAL TECHNICAL REPT.  
NO. 2, AD-728 053.

DESCRIPTORS: (\*HARAGING STEELS, POWDER  
METALLURGY), (\*NICKEL ALLOYS, POWDER  
METALLURGY), (\*COBALT ALLOYS, POWDER  
METALLURGY), (\*POWDER METALLURGY,  
\*QUENCHING(COOLING)), MELTING, ATOMIZATION,  
HOT PRESSING, MICROSTRUCTURE, MECHANICAL  
PROPERTIES, FREEZING, HEAT TREATMENT (U)  
IDENTIFIERS: STEEL 18 NI, NICKEL ALLOY IN-100,  
SOLIDIFICATION, THERMOMECHANICAL TREATMENT (U)

VARIOUS POWDER METALLURGY (P/M) AND QUENCH-  
CASTING TECHNIQUES WERE EMPLOYED TO GENERATE  
EXTREMELY FINE DENDRITE ARM SPACINGS AND HOMOGENEOUS  
STRUCTURES. IRON, NICKEL AND COBALT-BASE ALLOY  
POWDERS, PRODUCED BY STEAM ATOMIZATION (COARSE  
POWDERS), ARGON ATOMIZATION, VACUUM ATMOIZATION,  
AND THE ROTATING ELECTRODE PROCESS, WERE CONSOLIDATED  
INTO DENSE BILLETS BY HOT ISOSTATIC PRESSING (HIP)  
AND/OR EXTRUSION. NEW POWDER PROCESSES BASED ON  
SEPARATING SOLID NODULES FROM A LIQUID-SOLID MIXTURE  
AND RANDOM BREAK UP OF A FINE STREAM OF LIQUID METAL  
INTO SPHERICAL PARTICLES ARE BEING EVALUATED. THE  
HOT WORKING PROPERTIES OF P/M BILLETS AND QUENCH-  
CAST BARS WERE EVALUATED BY HOT ROLLING, HIGH STRAIN  
RATE TESTS, AND CREEP (SUPERPLASTIC) TESTING.  
TWO P/M SUPERALLOYS, MAR-M-509 (COBALT-  
BASE) AND IN-100 (NICKEL-BASE) AFTER HIP  
AND HOT EXTRUSION DEMONSTRATED EXCELLENT HOT  
WORKABILITY UNDER HIGH STRAIN RATE AND CREEP FORMING  
CONDITIONS, RESPECTIVELY. (AUTHOR) (U)



UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMCI

AD-739 516 11/6  
ARMY WEAPONS COMMAND ROCK ISLAND ILL WEAPONS LAB

EFFECT OF STRAIN RATE ON THE MECHANICAL  
PROPERTIES OF CR-MO-V STEEL AT ELEVATED  
TEMPERATURES.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
FEB 72 22P IYER, KAILASAM R. ;  
REPT. NO. SWERR-TR-72-6  
PROJ: DA-1-W-562604-A-607

UNCLASSIFIED REPORT

DESCRIPTORS: (\*STEEL, MECHANICAL PROPERTIES),  
HIGH-TEMPERATURE RESEARCH, CHROMIUM ALLOYS,  
MOLYBDENUM ALLOYS, VANADIUM ALLOYS,  
TEMPERATURE

(U)

IDENTIFIERS: STRAIN RATE

(U)

THE MECHANICAL PROPERTIES OF QUENCHED AND TEMPERED  
CR-MO-V STEEL WERE DETERMINED AT TEMPERATURES  
BETWEEN 800F AND 1300F AT STRAIN RATES RANGING  
FROM 0.002 TO 20/MIN. EXPERIMENTAL DATA WERE  
ANALYZED AS FUNCTIONS OF STRAIN RATE AND TEMPERATURE  
ON THE BASIS OF THREE SEMI-EMPIRICAL MECHANICAL  
EQUATIONS OF STATE. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-739 906 11/6  
ARMY MATERIALS AND MECHANICS RESEARCH CENTER WATERTOWN  
MASS

HARDNESS AND MICROSTRUCTURE OF PARTIALLY  
AUSTENITIZED 43XX STEEL.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
DEC 71 22P CHIAO, WEILY F. IKULA, ERIC  
B. I  
REPT. NO. AMMRC-TR-71-58  
PROJ: DA-1-T-062105-A-328

UNCLASSIFIED REPORT

DESCRIPTORS: (\*STEEL, MICROSTRUCTURE), HARDNESS,  
PHASE DIAGRAMS, HARDENING, QUENCHING(COOLING),  
METALLOGRAPHY  
IDENTIFIERS: HIGH STRENGTH STEELS

(U)

(U)

A STUDY WAS MADE OF MICROSTRUCTURES OF SEVERAL  
PARTIALLY AUSTENITIZED 43XX STEELS. BY QUENCHING  
FROM TEMPERATURES BELOW THOSE AT WHICH COMPLETE  
AUSTENITIZATION WOULD OCCUR, MICROSTRUCTURES OF  
MARTENSITE WITH FERRITE AND/OR CEMENTITE WERE  
OBTAINED. MICROSTRUCTURAL ANALYSIS ENABLED THE  
PHASE BOUNDARIES OF THE PERTINENT SECTION OF THE  
PHASE DIAGRAM TO BE DETERMINED. HARDNESS CHANGES  
IN THE AS-QUENCHED STRUCTURES WERE CORRELATED WITH  
THE PHASE DIAGRAM. THE MAJOR FACTOR CONTROLLING THE  
AS-QUENCHED HARDNESS IS THE VOLUME FRACTION AND  
CARBON CONTENT OF THE MARTENSITE IN THE STRUCTURE.  
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-742 038 11/6  
RENSSELAER POLYTECHNIC INST TROY N Y MATERIALS DIV

HETEROGENEOUS NUCLEATION OF GAMMA IN AL-AG  
AND AL-AG(CD OR CU) ALLOYS.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
APR 71 13P PASSOJA, DANN E. IANSELL,  
GEORGE S. I  
REPT. NO. TR-3  
CONTRACT: N00014-67-A-0117-0011  
PROJ: NR-031-689

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN ACTA METALLURGICA, V19  
P1253-1261 NOV 71,

SUPPLEMENTARY NOTE: REVISION OF REPORT DATED 7 JUN  
68.

DESCRIPTORS: (ALUMINUM ALLOYS, PHASE STUDIES),  
NUCLEATION, SILVER ALLOYS, CADMIUM ALLOYS,  
COPPER ALLOYS, DISLOCATIONS, ELECTRON MICROSCOPY  
IDENTIFIERS: TRANSMISSION ELECTRON MICROSCOPY

(U)

(U)

TRANSMISSION ELECTRON MICROSCOPY STUDIES OF  
HETEROGENEOUS NUCLEATION OF THE METASTABLE GAMMA'  
PHASE WERE MADE IN BINARY AND TERNARY ALLOYS OF AL-  
5 AT .% AG, AL-4.8 AT .% AG-0.15 AT .%  
CD AND AL-4.8 AT .% AG-0.2 AT .% CU.  
HETEROGENEOUS NUCLEATION OF GAMMA' WAS FOUND TO  
BE ASSOCIATED WITH FOUR TYPES OF DISLOCATIONS  
REGARDLESS OF THE QUENCHING TREATMENT OR ALLOY  
ADDITIONS WHICH WERE USED. NUCLEATION WAS FOUND TO  
OCCUR ON: (A) JOGGED DISLOCATIONS; (B)  
HELICAL DISLOCATIONS; (C) DISLOCATION LOOPS;  
(D) HETEROGENEOUS CLIMB SOURCES. ONLY ONE  
NUCLEATION MECHANISM WAS FOUND TO BE UNIQUE TO THE  
TERNARY ALLOYS: THAT OF NUCLEATION ON  
HETEROGENEOUS CLIMB SOURCES. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-745 487 11/6  
CARNEGIE-MELLON UNIV PITTSBURGH PA

EXTENSION OF SOLID SOLUBILITY DURING  
MASSIVE TRANSFORMATIONS,

(U)

APR 71 11P MASSALSKI, T. B. PERKINS,  
A. J. JAKLOVSKY, J. I  
CONTRACT: DA-ARO-D-31-124-72-690  
PROJ: DA-2-0-061102-B-32-D  
MONITOR: AROD 8253:7-MC

UNCLASSIFIED REPORT  
AVAILABILITY: PUB. IN METALLURGICAL  
TRANSACTIONS, V3 P687-694 MAR 72.

DESCRIPTORS: (\*COPPER ALLOYS, PHASE STUDIES),  
(\*SILVER ALLOYS, PHASE STUDIES), (\*CADMIUM  
ALLOYS, PHASE STUDIES), ZINC ALLOYS, ALUMINUM  
ALLOYS, PHASE DIAGRAMS, MICROSTRUCTURE

(U)

RECENT STUDIES OF MASSIVE TRANSFORMATION IN SYSTEMS  
BASED ON COPPER OR SILVER HAVE SHOWN THAT THE DEGREE  
TO WHICH THE PRIMARY SOLID SOLUTION, ALPHA, MAY BE  
EXTENDED INTO THE TWO-PHASE FIELD, (ALPHA +  
BETA), DURING A COMPOSITION INVARIANT MASSIVE  
TRANSFORMATION, VARIES FROM SYSTEM TO SYSTEM, AND  
DEPENDS UPON A NUMBER OF FACTORS. A SYSTEMATIC  
STUDY OF THIS POINT WAS PERFORMED IN THE CU-ZN,  
CU-AL, AND AG-CD SYSTEMS, USING QUENCHING AND  
HEATING TECHNIQUES. IN EACH SYSTEM A SERIES OF  
ALLOYS, INCREASING BY SMALL INTERVALS (0.1 AT.  
PCT) OF SOLUTE CONTENT, WAS EXAMINED. PARTICULAR  
CARE WAS TAKEN IN THE CONTROL OF COMPOSITION AND  
HOMOGENEITY OF THESE ALLOYS.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMCI

AD-745 491 11/6 20/12  
GENERAL ELECTRIC CO SCHENECTADY N Y RESEARCH AND  
DEVELOPMENT CENTER

IMPURITY CURRENTS GENERATED BY VACANCY  
CURRENTS IN METALS,

(U)

71 17P ANTHONY, T. R. I  
CONTRACT: DAHCO4-69-C-0070  
PROJ: DA-2-0-061102-B-32-D  
MONITOR: AROD 8156:7-MC

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN ATOMIC TRANSPORT IN  
SOLIDS AND LIQUIDS, V4 N5 P138-150 1971.

DESCRIPTORS: (\*ALUMINUM ALLOYS, GRAIN  
STRUCTURES(METALLURGY)), (\*GRAIN  
STRUCTURES(METALLURGY), IMPURITIES), GRAIN  
BOUNDARIES, RADIATION DAMAGE, NEUTRON REACTIONS,  
BREMSSTRAHLUNG  
IDENTIFIERS: VACANCIES(CRYSTAL DEFECTS)

(U)  
(U)

DURING COOLING FROM A HIGH-TEMPERATURE ANNEAL,  
VACANCY CURRENTS WERE OBSERVED TO CAUSE IMPURITIES TO  
SEGREGATE AROUND VACANCY PRECIPITATE CAVITIES IN  
ALUMINUM. FROM THE VACANCY AND VACANCY-GENERATED  
IMPURITY CURRENTS DIRECTLY MEASURED IN THESE  
EXPERIMENTS, THE RATIOS OF VACANCY JUMP FREQUENCIES  
AWAY FROM AND AROUND IMPURITY ATOMS IN ALUMINUM ARE  
DETERMINED. THESE RATIOS SUGGEST ONLY A SMALL  
INTERACTION BETWEEN VACANCIES AND IMPURITIES AND/OR  
AN INCREASE IN THE JUMP FREQUENCY OF ALUMINUM ATOMS  
AROUND IMPURITIES IN ALUMINUM. THE SEGREGATION  
THAT WOULD BE PRODUCED AROUND GRAIN BOUNDARY VACANCY  
SINKS DURING QUENCHING AND IRRADIATION WAS COMPUTED  
FROM THE VACANCY CURRENT AND THE VACANCY-GENERATED  
IMPURITY CURRENTS MEASURED IN THESE EXPERIMENTS. IT  
WAS FOUND THAT MODERATE AND VERY LARGE CHANGES IN THE  
GRAIN BOUNDARY IMPURITY CONCENTRATION COULD BE  
EXPECTED DURING QUENCHING AND IRRADIATION,  
RESPECTIVELY. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-746 195 11/6  
RENSSELAER POLYTECHNIC INST TROY N Y MATERIALS DIV

EFFECT OF TITANIUM ADDITIONS ON THE AGING  
CHARACTERISTICS OF AN AL-ZN-MG ALLOY. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
AUG 72 27P JUDD, GARY IGROVE, C. A. I  
REPT. NO. TR-4  
CONTRACT: N00014-67-A-0117-0009

UNCLASSIFIED REPORT

DESCRIPTORS: (\*ALUMINUM ALLOYS, \*DISPERSION  
HARDENING), TITANIUM, PHASE STUDIES,  
AGING(MATERIALS), HARDNESS, MICROSTRUCTURE,  
DISLOCATIONS, HEAT TREATMENT (U)  
IDENTIFIERS: ALUMINUM ALLOY 5.32ZN 1.66MG  
0.041TI, SOLVUS TEMPERATURE (U)

A MINUTE TITANIUM ADDITION (.04%) WAS ADDED TO  
AN AL-ZN-MG ALLOY IN ORDER TO DETERMINE THE  
EFFECT OF TITANIUM ON MICROSTRUCTURE AND AGING  
CHARACTERISTICS OF THIS ALLOY. TITANIUM WAS FOUND  
TO RETARD THE KINETICS OF PRECIPITATION AND TO  
PREVENT SOLUTE SEGREGATION TO GRAIN BOUNDARIES ON AIR  
QUENCHING. BELOW G.P. SOLVUS TEMPERATURE,  
HARDENING OF THE ALLOY WAS DUE BOTH TO DISLOCATION  
LOOP FORMATION AND TO G.P. ZONE FORMATION.  
ABOVE G.P. SOLVUS TEMPERATURE, HARDENING WAS  
DUE ONLY TO FORMATION OF PRECIPITATE. THESE  
RESULTS HAVE BEEN EXPLAINED IN TERMS OF TITANIUM  
REDUCING THE LIKELIHOOD OF THE FORMATION OF  
SOLUTE VACANCY COMPLEXES! CAUSING A REDUCTION IN ZINC  
AND MAGNESIUM MOBILITY. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-749 508 19/1 11/6  
ALUMINUM CO OF AMERICA NEW KENSINGTON PA ALCOA RESEARCH  
LABS

FEASIBILITY STUDY FOR DEVELOPMENT OF AN  
ALUMINUM ALLOY FOR FABRICATION OF SMALL  
ARMS CARTRIDGE CASES.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 2 APR 70-2 JUN 72,  
JUN 72 75P ROGERS, RALPH W. , JR;  
REPT. NO. 13-AX202  
CONTRACT: DAAA25-68-C-0771

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*CARTRIDGE CASES, \*ALUMINUM ALLOYS),  
FEASIBILITY STUDIES, ZINC ALLOYS, COPPER ALLOYS,  
MAGNESIUM ALLOYS, ZIRCONIUM ALLOYS, STRAIN  
HARDENING, MECHANICAL PROPERTIES, CORROSION  
RESISTANCE, THERMAL STABILITY, HEAT TREATMENT,  
GRAIN SIZE

(U)

SEVENTEEN EXPERIMENTAL HEAT-TREATABLE AL-ZN-  
MG-CU ALLOYS AND FOUR AL-MG OR AL-MG-ZN  
STRAIN-HARDENABLE ALLOYS WERE EVALUATED FOR  
SUITABILITY AS CARTRIDGE CASE MATERIALS. SIXTEEN  
ALLOYS WERE OF LOW IMPURITY LEVEL ACHIEVED BY USE OF  
REFINED 99.99 AL INGOT AS BASE METAL AND WERE  
ROLLED TO .015 INCH AND .063 INCH SHEET BY PRACTICES  
DEVELOPING HIGH DEGREES OF HOMOGENEITY. FIVE ALLOYS  
WERE OF MODERATE PURITY. COMPARISONS AMONG ALLOYS  
WERE MADE ON BASIS OF STRENGTH-TOUGHNESS  
CHARACTERISTICS, CORROSION RESISTANCE, TEMPERATURE  
STABILITY, QUENCH SENSITIVITY, ANNEALING  
CHARACTERISTICS AND GRAIN SIZE PROPERTIES.  
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-749 679 11/6 13/8  
MASSACHUSETTS INST OF TECH CAMBRIDGE CENTER FOR MATERIALS  
SCIENCE AND ENGINEERING

STRUCTURE AND PROPERTY CONTROL THROUGH RAPID  
QUENCHING OF LIQUID METALS. (U)

DESCRIPTIVE NOTE: SEMI-ANNUAL TECHNICAL REPT. NO. 4, 1  
JAN-31 JUL 72,  
JUL 72 140P GRANT, NICHOLAS J. IPELLOUX,  
REGIS M. IFLEMINGS, MERTON C. IARGON, ALI S.  
1

CONTRACT: DAHC15-70-C-0283, ARPA ORDER-1608

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-739 340.

DESCRIPTORS: (\*ALUMINUM ALLOYS, POWDER  
METALLURGY), (\*MARTENSITIC STEELS, POWDER  
METALLURGY), (\*NICKEL ALLOYS, POWDER  
METALLURGY), (\*COBALT ALLOYS, POWDER  
METALLURGY), (\*POWDER METALLURGY,  
\*QUENCHING(COOLING)), (\*ALUMINUM, POWDER  
METALLURGY), MELTING, ATOMIZATION, HOT PRESSING,  
MICROSTRUCTURE, MECHANICAL PROPERTIES, FREEZING,  
HEAT TREATMENT, HOT WORKING (U)

IDENTIFIERS: STEEL 18Ni, NICKEL ALLOY IN-100,  
ALUMINUM ALLOY 7075, THERMOMECHANICAL TREATMENT,  
COBALT ALLOY MAR-M-509 (U)

VARIOUS POWDER METALLURGY (P/M) AND QUENCH-  
CASTING TECHNIQUES WERE EMPLOYED TO GENERATE  
EXTREMELY FINE DENDRITE ARM SPACINGS AND HOMOGENEOUS  
STRUCTURES. IRON, NICKEL AND COBALT-BASE ALLOY  
POWDERS, PRODUCED BY STEAM ATOMIZATION (COARSE  
POWDERS), ARGON ATOMIZATION, VACUUM ATOMIZATION,  
AND THE ROTATING ELECTRODE PROCESS, WERE CONSOLIDATED  
INTO DENSE BILLETS BY HOT ISOSTATIC PRESSING (HIP)  
AND/OR EXTRUSION. THE HOT WORKING PROPERTIES OF  
P/M BILLETS AND QUENCH-CAST BARS WERE EVALUATED  
BY HOT ROLLING, HIGH STRAIN RATE TESTS, AND CREEP  
(SUPERPLASTIC) TESTING. DETAILED ANALYSES OF  
MICROSTRUCTURE, HEAT TREATMENT, AND MECHANICAL  
PROPERTIES ARE PRESENTED FOR ALL P/M ALLOYS AND  
COMPARED TO EQUIVALENT CAST MATERIALS.  
(AUTHOR) (U)



UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-751 534 11/6  
NAVAL RESEARCH LAB WASHINGTON D C

SIGNIFICANCE OF CHARPY-V TEST PARAMETERS AS  
CRITERIA FOR QUENCHED AND TEMPERED STEELS,

(U)

OCT 72 21P PUZAK, P. P. ILANGE, E. A.

REPT. NO. NRL-7483  
CONTRACT: AT(04-3)-863  
PROJ: NRL-M01-25, RR-022-01-46  
TASK: 5432

UNCLASSIFIED REPORT

DESCRIPTORS: (\*STEEL, \*FRACTURE(MECHANICS)),  
(\*IMPACT TESTS, FRACTURE(MECHANICS)), TEST  
METHODS, DUCTILITY  
IDENTIFIERS: HIGH STRENGTH STEELS, STEEL HY-130,  
STEEL 2.25CR 1MO

(U)

(U)

A DUCTILITY PARAMETER HAS BEEN SUGGESTED TO REPLACE  
THE ENERGY PARAMETER AS THE CRITERION OF PERFORMANCE  
OF A QUENCHED AND TEMPERED STEEL. THE LATERAL  
EXPANSION (LE) OF THE CHARPY V SPECIMEN HAS BEEN  
HYPOTHESIZED TO BE A SELF-ADJUSTING INDEX OF FRACTURE  
RESISTANCE TO COMPENSATE FOR THE WIDE RANGE IN THE  
YIELD STRENGTH OF QUENCHED AND TEMPERED STEELS.  
THIS HYPOTHESIS IS EXAMINED USING INFORMATION FROM  
AN EXTENSIVE BANK OF DATA GENERATED AT NRL AS WELL  
AS THE INFORMATION IN THE LITERATURE.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-753 273 11/6  
MARTIN MARIETTA CORP BALTIMORE MD RESEARCH INST. FOR  
ADVANCED STUDIES

STRESS-CORROSION CRACKING OF AL-ZN-MG  
ALLOYS: THE CORROSION BEHAVIOR OF GRAIN  
BOUNDARY CONSTITUENTS.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
DEC 72 18P SEDRIKS, A. J. IGREEN, J.  
A. S. INOVAK, D. L. ;  
REPT. NO. RIAS-TR-72-25C, TR-6  
CONTRACT: N00014-67-C-0496  
PROJ: NR-031-716

UNCLASSIFIED REPORT

DESCRIPTORS: (\*ALUMINUM ALLOYS, \*STRESS  
CORROSION), GRAIN BOUNDARIES, ZINC ALLOYS,  
MAGNESIUM ALLOYS, ELECTROCHEMISTRY, SIMULATION

(U)

SINCE THE GRAIN-BOUNDARY CONSTITUENTS IN AL-ZN-MG ALLOYS ARE GENERALLY TOO FINE FOR THEIR CORROSION BEHAVIOR TO BE STUDIED IN SITU, AN EXPERIMENTAL APPROACH INVOLVING SIMULATION WAS ADOPTED. THIS INVOLVED THE EXAMINATION OF THE CORROSION BEHAVIOR OF A SMALL INGOT OF MGZN2, THE AL-ZN-MG ALLOY IN THE AS-QUENCHED STATE, AND PURE ALUMINUM. THE PURE ALUMINUM AND THE AS-QUENCHED ALLOY WERE CONSIDERED TO REPRESENT THE TWO LIMITING CASES OF THE MATERIAL COMPRISING THE PRECIPITATE-FREE ZONE; PURE ALUMINUM REPRESENTING THE LIMITING CASE OF THE SOLUTE-DEPLETED REGION AND THE AS-QUENCHED ALLOY THE VACANCY DEPLETED REGION.  
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-753 928 11/6  
WATERVLJET ARSENAL N Y

RAPIDLY AUSTENITIZED LOW CARBON STEEL.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,

OCT 72 35P GRIFFIN, RICHARD B. IPEPE,

JOSEPH I

REPT. NO. WVT-7252

PROJ: DA-1-T-062105-A-32-B

UNCLASSIFIED REPORT

DESCRIPTORS: (\*STEEL, PHASE STUDIES), HEAT  
TREATMENT, IRON COMPOUNDS, CARBIDES, DISSOCIATION,  
NUCLEATION

(U)

IDENTIFIERS: STEEL 1010, DISSOLVING, PHASE  
TRANSFORMATIONS, IRON CARBIDES

(U)

A 1010 CARBON STEEL, IN THE ANNEALED CONDITION, WAS USED TO STUDY THE DISSOLUTION BEHAVIOR OF FE<sub>3</sub>C PARTICLES UNDER CONDITIONS OF RAPID HEATING AND SHORT TIMES AT TEMPERATURE. THE STUDY USED A CAPACITOR-DISCHARGE PULSE HEATING AND QUENCHING SYSTEM TO ACHIEVE HEATING RATES OF 1,000,000 C/SEC, QUENCHING RATES OF 10,000 C/SEC, AND TIMES AT TEMPERATURES FROM 15 TO 500 MSEC. A QUALITATIVE DESCRIPTION IS GIVEN OF THE EFFECT PULSE HEATING OF ALLOYS, INTO THE TWO PHASE (FERRITE PLUS AUSTENITE) AND INTO THE SINGLE PHASE (AUSTENITE REGION), HAVE ON THE SAMPLES. METALLOGRAPHIC EVIDENCE IS PRESENTED CONFIRMING THE SUGGESTION THAT PULSE HEATING AND RAPID QUENCHING CAN PRODUCE REGIONS HAVING HIGHER CARBON CONCENTRATIONS THAN THE SAME ALLOY HEATED UNDER EQUILIBRIUM CONDITIONS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-754 530 14/2 19/6  
WATERVLIET ARSENAL N Y

THE PULSAR: AN ULTRA HIGH SPEED  
HEATING AND QUENCHING SYSTEM.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
SEP 72 22P GRIFFIN, RICHARD B. I  
REPT. NO. WVT-7250  
PROJ: DA-1-T-062105-A-345

UNCLASSIFIED REPORT

DESCRIPTORS: (LABORATORY EQUIPMENT, HEAT  
TREATMENT), (GUN BARRELS, THERMAL STRESSES),  
HEATING, QUENCHING (COOLING), PHASE  
STUDIES

(U)

IDENTIFIERS: CAPACITOR DISCHARGE PULSE HEATING

(U)

A CAPACITOR-DISCHARGE PULSE HEATING AND QUENCHING  
SYSTEM, CALLED THE PULSAR, HAS BEEN BUILT AND MADE  
OPERATIVE AT THE WATERVLIET ARSENAL. METALLIC  
SAMPLES, UP TO 1/10 INCH IN CROSS SECTIONAL AREA, MAY  
BE HEATED AT 1,000,000 C/SEC HELD AT TEMPERATURE  
FROM 15 TO 500 MILLISEC, AND THEN SPARY WATER  
QUENCHED AT 10,000 C SEC. THIS ALLOWS  
METALLURGICAL REACTIONS, SUCH AS DISSOLUTION, GRAIN  
REFINEMENT, AND CONSTITUTIONAL LIQUATION TO BE  
STUDIED BEFORE COMPLETION. THE SYSTEM ENABLES ONE  
TO SEPARATE OUT THE EFFECTS OF TEMPERATURE FROM THE  
OTHER METALLURGICAL MECHANICAL AND CHEMICAL EFFECTS  
THAT A GUN TUBE UNDERGOES DURING A FIRING CYCLE.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-757 677 11/6 13/8  
MASSACHUSETTS INST OF TECH CAMBRIDGE CENTER FOR MATERIALS  
SCIENCE AND ENGINEERING

STRUCTURE AND PROPERTY CONTROL THROUGH RAPID  
QUENCHING OF LIQUID METALS. (U)

DESCRIPTIVE NOTE: SEMI-ANNUAL TECHNICAL REPT. NO. 5, 31  
JUL-31 DEC 72,  
DEC 72 128P GRANT, NICHOLAS J. IPELLOUX,  
REGIS M. IFLEMINGS, MERTON C. IARGON, ALI S.

CONTRACT: DAHC15-70-C-0283, ARPA ORDER-1608

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO REPORT DATED 31 JUL 72,  
AD-749 679.

DESCRIPTORS: (\*MARTENSITIC STEELS, POWDER  
METALLURGY), (\*NICKEL ALLOYS, POWDER  
METALLURGY), (\*COBALT ALLOYS, POWDER  
METALLURGY), (\*POWDER METALLURGY,  
\*QUENCHING(COOLING)), MECHANICAL PROPERTIES,  
MICROSTRUCTURE, FREEZING, ATOMIZATION, HOT  
PRESSING, PROCESSING, HOT WORKING, HEAT  
TREATMENT (U)  
IDENTIFIERS: STEEL 18NI, NICKEL ALLOY IN-100,  
COBALT ALLOY MAR-M-509 (U)

THE PROCESSING OF BILLETS FROM RAPIDLY QUENCHED  
LIQUID METALS WAS INVESTIGATED. VARIOUS POWDER  
METALLURGY (P/M) AND QUENCH-CASTING TECHNIQUES  
WERE EMPLOYED TO GENERATE EXTREMELY FINE DENDRITE ARM  
SPACINGS AND HOMOGENEOUS STRUCTURES. IRON, NICKEL  
AND COBALT-BASE ALLOY POWDERS, PRODUCED BY STEAM  
ATOMIZATION (COARSE POWDERS), ARGON ATOMIZATION,  
VACUUM ATOMIZATION, AND THE ROTATING ELECTRODE  
PROCESS, WERE CONSOLIDATED INTO DENSE BILLETS BY HOT  
ISOSTATIC PRESSING (HIP) AND/OR EXTRUSION. THE  
HOT WORKING PROPERTIES OF P/M BILLETS AND QUENCH-  
CAST BARS WERE EVALUATED BY HOT ROLLING, HIGH STRAIN  
RATE TESTS, AND CREEP (SUPERPLASTIC) TESTING.  
DETAILED ANALYSES OF MICROSTRUCTURE, HEAT  
TREATMENT, AND MECHANICAL PROPERTIES ARE PRESENTED  
FOR ALL P/M ALLOYS AND COMPARED TO EQUIVALENT  
CAST MATERIALS. (AUTHOR MODIFIED ABSTRACT) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-759 117 13/8 11/6 19/1  
EDGEWOOD ARSENAL MD

VACUUM BRAZING-GAS QUENCHING OF CHEMICAL  
AND ORDNANCE MUNITIONS.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT. SEP 67-DEC 70,  
MAR 73 65P GURTNER, FRANCIS B. I  
REPT. NO. EA-TR-4659  
PROJ: AMC-4932-5671129

UNCLASSIFIED REPORT

DESCRIPTORS: (\*ALLOYS, BRAZING), (\*BRAZING,  
\*VACUUM APPARATUS), (\*ORDNANCE, \*MANUFACTURING  
METHODS), ORDNANCE LABORATORIES, THERMAL JOINING,  
HELIUM GROUP GASES, QUENCHING(COOLING),  
MICROSTRUCTURE, METALLOGRAPHY, HEAT TREATMENT

(U)

IDENTIFIERS: ALUMINUM ALLOY 2219, ALUMINUM ALLOY  
2014, ALUMINUM ALLOY 7039, ALUMINUM ALLOY 6061,  
TITANIUM ALLOY 6AL 4V, MARAGING STEEL 250,  
STEEL 2219, STEEL 2014, STEEL 7039, STEEL  
1045, STEEL 8620, STEEL 4130, STEEL 4340,  
STEEL 1020, STEEL 316, STEEL 347, VACUUM  
BRAZING GAS QUENCHING PROCESS

(U)

THE VACUUM BRAZING-GAS QUENCHING PROCESS OR VACUUM  
HEATING-GAS QUENCHING PROCESS IS NOW A RELIABLE  
METHOD OF JOINING MATERIALS, MILITARY AND/OR  
COMMERCIAL HARDWARE ITEMS. THESE HARDWARE ITEMS  
INCLUDE SMALL MUNITIONS FOR CHEMICALS, ORDNANCE  
MUNITIONS, PARTS FOR JET ENGINES, TANKS, MORTARS,  
VEHICLE ASSEMBLIES, AND TRANSPORTATION MECHANISMS  
SUCH AS TRUCKS AND PERSONNEL CARRIERS. THE  
APPLICATION OF THIS PROCESS INDICATES QUITE READILY  
THAT IT IS EXTREMELY BROAD, NOT LIMITED TO A SMALL  
AREA OR SCOPE OF ENDEAVOR. ALL THAT IS LACKING IS  
THE COORDINATED EFFORT TO PUT THIS PROCESS TO WORK  
WITHIN DOD. THE DESIGN CAPABILITY EXISTS FOR  
MANUFACTURING, CONSTRUCTIN, OR BUILDING A MULTI-  
CONTINUOUS CHAMBER SYSTEM. THE PROCESS PRODUCES AN  
ULTRAHIGH VALUE WHEN RELATED TO QUALITY -  
PRODUCIBILITY IS 99.99% FOR A HELIUM LEAK STANDARD  
OF .000006 CC PER SECOND FOR 15 SECONDS AT ONE  
ATMOSPHERIC DIFFERENTIAL IN PRESSURE. THE  
MECHANICAL PROPERTIES OF THE MATERIALS OF THIS  
PROCESS ARE EQUAL TO AND/OR SUPERIOR TO THOSE  
MECHANICAL PROPERTIES OF THE MATERIALS PROCESSED BY  
CONVENTIONAL METHODS. THE MICROSTRUCTURE OF EACH  
MATERIAL OR OF THE OVERALL MATERIALS ARE SLIGHTLY  
DIFFERENT BUT SERVES AS AN ADVANTAGE TO PROCESSING. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-759 626 11/6  
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

THE EFFECT OF PRELIMINARY HEAT TREATMENTS  
ON THE CORROSION OF TITANIUM ALLOY TVO. (U)

APR 73 16P SHAPOVALOVA, O. M. IKURILEKH,  
L. P. IKAMENSHCHIK, E. L. I  
REPT. NO. FTD-MT-24-1712-72

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED MACHINE TRANS. OF  
METALLURGIYA I KHIMIYA TITANA. SBORNIK TRUDOV  
(USSR) N5 P90-99 1970, BY ROBERT ALLEN POTTS.

DESCRIPTORS: (\*TITANIUM ALLOYS, \*CORROSION),  
HEAT TREATMENT, QUENCHING(COOLING),  
MICROSTRUCTURE, USSR (U)  
IDENTIFIERS: TRANSLATIONS (U)

THE REPORT GIVES THE RESULTS OF INVESTIGATION OF  
THE EFFECT OF QUENCHING ON THE CORROSION OF SECONDARY  
TITANIUM ALLOY (TVO). (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-761 148 11/6  
NAVAL RESEARCH LAB WASHINGTON D C

LIGAMENT INSTABILITY MODEL FOR STRESS  
CORROSION AND FATIGUE CRACK PROPAGATION IN A  
4340 STEEL.

(U)

DESCRIPTIVE NOTE: INTERIM REPT.,  
APR 73 47P KRAFFT, JOSEPH M. ISMITH,  
HERSCHEL L. I  
REPT. NO. NRL-MR-2598  
PROJ: NRL-F01-03, RR023-03-45

UNCLASSIFIED REPORT

DESCRIPTORS: (\*STEEL, \*STRESS CORROSION),  
FATIGUE (MECHANICS), CRACKS, CRACK PROPAGATION,  
TENSILE PROPERTIES, CREEP, CORROSION,  
MATHEMATICAL MODELS  
IDENTIFIERS: STEEL 4340, STEEL A-533, FRACTURE  
MECHANICS

(U)

(U)

THE MODEL IS ONE WHICH EXPLAINS THE GROWTH OF  
CRACKS IN TERMS OF THE ECONOMICS OF MAINTAINING  
STABILITY OF PLASTIC FLOW AT THE CRACK TIP. THE  
MATERIAL THERE IS TAKEN TO BE SUBDIVIDED INTO TENSILE  
ELEMENTS, UNITS OF SIZE D SUB T. THERE  
INSTABILITY IS INDUCED BY CORROSION BY STRESS  
RELAXATION, BY CONTRACTION IN AREA DUE TO STRETCHING;  
THEIR STABILITY IS RESTORED BY STRAIN HARDENING, BUT  
THIS REQUIRES STRAIN AND THIS, AT CONSTANT LOAD,  
CRACK GROWTH. THE MODEL IS TESTED IN TERMS OF DATA  
ON THE AQUEOUS STRESS CORROSION CRACKING AND  
CORROSION FATIGUE CRACK PROPAGATION IN AN AISI 4340  
STEEL, QUENCHED AND TEMPERED BACK AT 204, 316, 427  
AND 538C. DATA FROM THE LITERATURE ON ANOTHER  
4340 AND ON A533 B-1 PRESSURE VESSEL STEEL IS  
ALSO EXAMINED. TENSILE AS WELL AS CYCLIC STRESS-  
STRAIN CURVES WERE ANALYZED FOR EACH MATERIAL.  
(MODIFIED AUTHOR ABSTRACT)

(U)



UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-762 979 11/6  
LEHIGH UNIV BETHLEHEM PA DEPT OF METALLURGY AND MATERIALS  
SCIENCE

THE DEVELOPMENT OF MARTENSITIC MICROSTRUCTURE  
AND MICROCRACKING IN AN FE-1.86C ALLOY, (U)

JAN 72 8P HENDIRATTA, M. G. IKRAUSS,  
G. I  
CONTRACT: DA-ARO-D-31-124-73-625  
MONITOR: AROD 9121:2-MC

UNCLASSIFIED REPORT  
AVAILABILITY: PUB. IN METALLURGICAL  
TRANSACTIONS, V3 P1755-1760 JUL 72.

DESCRIPTORS: (\*STEEL, MICROSTRUCTURE),  
MARTENSITE, FRACTURE(MECHANICS), PHASE  
STUDIES, REACTION KINETICS, METALLOGRAPHY (U)

THE DEVELOPMENT OF THE MARTENSITIC MICROSTRUCTURE  
IN A 1.86 WT PCT C STEEL WAS FOLLOWED BY  
QUANTITATIVE METALLOGRAPHIC MEASUREMENTS OVER THE  
TRANSFORMATION RANGE OF 0.12 TO 0.60 FRACTION  
TRANSFORMED (F). THE TRANSFORMATION KINETICS  
ARE DESCRIBED BY THE EQUATION  $F = 1 - \exp(-0.008$   
 $(M \text{ SUB } S - T \text{ SUB } Q))$  WHERE M SUB S AND T  
SUB Q ARE THE MARTENSITE START AND THE QUENCHING  
TEMPERATURES RESPECTIVELY. FULLMAN'S ANALYSIS SHOWS  
THAT THE AVERAGE VOLUME PER MARTENSITE PLATE  
DECREASES BY ALMOST AN ORDER OF MAGNITUDE OVER THE  
TRANSFORMATION RANGE STUDIED, BUT THIS DECREASE IS  
LESS THAN THAT PREDICTED BY THE FISHER ANALYSIS FOR  
PARTITIONING OF AUSTENITE BY SUCCESSIVE GENERATIONS  
OF MARTENSITE. MICROCRACKING INCREASES WITH  
INCREASING F UP TO 0.3, BUT DOES NOT INCREASE FOR F  
ABOVE 0.3 WHERE TRANSFORMATION PROCEEDS BY THE  
NUCLEATION OF LARGE NUMBERS OF SMALL MARTENSITE  
PLATES. THESE OBSERVATIONS INDICATE THAT A CRITICAL  
SIZE OF MARTENSITE PLATE IS NECESSARY TO CAUSE  
MICROCRACKING. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDHC1

AD-763 900 11/6  
ARMY MATERIALS AND MECHANICS RESEARCH CENTER WATERTOWN  
MASS

THERMAL EMBRITTLEMENT OF 4340 STEEL. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
DEC 72 19P CARR, FRANK L. DESISTO,  
THOMAS S. I  
REPT. NO. AMMRC-TR-72-39  
PROJ: DA-1-T-062105-A-328

UNCLASSIFIED REPORT

DESCRIPTORS: (STEEL, EMBRITTLEMENT),  
BRITTLINESS, TRANSITION TEMPERATURE, TOUGHNESS,  
HARDNESS, TEMPERING, MICROSTRUCTURE, IMPACT  
TESTS (U)  
IDENTIFIERS: STEEL 4340 (U)

FRACTURE APPEARANCE TRANSITION TEMPERATURES  
OBTAINED WITH IMPACT SPECIMENS WERE USED TO STUDY THE  
THERMAL EMBRITTLEMENT OF 4340 STEEL BETWEEN 950 AND  
1250 F (510 AND 675 C). EMBRITTLEMENT  
OCCURRED AT THE HIGHER TEMPERATURES BUT NOT IN THE  
VICINITY OF 1000 F WITHIN 16 DAYS. THE DEGREE OF  
EMBRITTLEMENT DEPENDED ON BOTH TIME AND TEMPERATURE.  
REDUCTIONS IN TOUGHNESS WERE CORRELATED WITH  
CHANGES IN THE MORPHOLOGY AND SIZE OF FERRITE GRAINS  
AS WELL AS THE SIZE OF CARBIDE PARTICLES. THESE  
MICROSTRUCTURAL CHANGES WERE SIMILAR TO THOSE  
OBSERVED IN BOTH 3140 AND PLAIN CARBON STEELS BY  
OTHER INVESTIGATORS. CONVENTIONAL ANISOTHERMAL  
PROCEDURES USED TO PRODUCE TEMPER BRITTLINESS IN LOW  
ALLOY STEELS ALSO EMBRITTLE THESE STEELS BY ANOTHER  
MECHANISM. THUS, THE DEGRADATION OF TOUGHNESS  
ATTRIBUTED TO TEMPER BRITTLINESS RESULTS FROM TWO  
DIFFERENT MODES OF EMBRITTLEMENT. TRANSITIONAL  
BEHAVIOR PREVIOUSLY DESCRIBED AS THE RETROGRESSION OF  
TEMPER BRITTLINESS IS CONCLUDED TO RESULT FROM  
THERMAL EMBRITTLEMENT. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-763 988 11/6 1971  
NATIONAL MATERIALS ADVISORY BOARD (NAS-NAE) WASHINGTON D  
C

PRODUCIBILITY OF ARTILLERY SHELLS MADE FROM  
HF-1 STEEL. REPORT OF THE AD HOC COMMITTEE  
ON SHELL STEEL.

(U)

DESCRIPTIVE NOTE: FINAL REPT.

APR 73 112P

REPT. NO. NMAB-307

CONTRACT: DAAA25-73-C-0106

UNCLASSIFIED REPORT

DESCRIPTORS: (\*STEEL, FEASIBILITY STUDIES),  
(\*PROJECTILE CASES, STEEL), FRAGMENTATION,  
HAZARDS, QUALITY CONTROL, POWDER METALLURGY,  
FRACTURE(MECHANICS), STRESSES,  
DEFECTS(MATERIALS)

(U)

IDENTIFIERS: STEEL HF-1, HIGH CARBON STEELS

(U)

A REVIEW OF PROBLEMS THAT MIGHT ARISE IN CONVERTING  
TO HF-1 STEEL FOR SHELL PRODUCTION LED TO THE  
CONCLUSION THAT SUCH DIFFICULTIES AS MIGHT BE  
ENCOUNTERED IN STEEL PRODUCTION OR IN MANUFACTURING  
WOULD NOT BE OF A NATURE AS TO IMPEDE USE OF THE NEW  
STEEL. RECOMMENDATIONS TO EXPEDITE THE CONVERSION  
ARE MADE. ATTENTION IS CALLED TO THE NEED FOR MORE  
STRINGENT INSPECTION, WHICH FOLLOWS FROM THE GREATER  
FLAW SENSITIVITY OF HF-1. THE NEED FOR DATA TO  
ASSESS THE CRITICAL FLAW SIZE OF QUENCHED-AND-  
TEMPERED HF-1 IS EMPHASIZED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-764 150 11/6  
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF METALLURGY  
AND MATERIALS SCIENCE

ON THE MECHANISM OF DISPERSION STRENGTHENING.

(I). STORED ENERGY MEASUREMENT IN  
DISPERSION STRENGTHENED IRON. (II).

(U)

DESCRIPTIVE NOTE: FINAL REPT.,

JUL 73 44P

GRANT, NICHOLAS J. IKENAGY,

DONALD WOLF, STANLEY I

CONTRACT: NONR-3963(18)

PROJ: MIT-DSR-74621

UNCLASSIFIED REPORT

DESCRIPTORS: (COPPER ALLOYS, DISPERSION  
HARDENING), (IRON, DISPERSION HARDENING),  
ALUMINA, SILICON DIOXIDE, MOLYBDENUM, COBALT  
ALLOYS, ALUMINUM ALLOYS, POWDER METALLURGY,  
INTERMETALLIC COMPOUNDS, MECHANICAL PROPERTIES

(U)

A GROUP OF 42 COPPER BASE ALLOYS CONTAINING 5  
DISPERSOIDS (Al<sub>2</sub>O<sub>3</sub>, SiO<sub>2</sub>, COAL, FE, AND  
MO) IN AMOUNTS OF 3, 7, AND 11 PERCENT, WITH  
PARTICLE SIZES RANGING FROM 0.01 TO 25 MICRONS (3  
SIZES IN EACH ALLOY SERIES), WERE PREPARED BY  
POWDER BLENDING. AFTER EXTRUSION AT A REDUCTION  
RATIO OF 6 TO 1 AT 745C, THE ALLOYS WERE TESTED FOR  
HARDNESS, YIELD AND TENSILE STRENGTH, DUCTILITY, AND  
IN STRESS RUPTURE AT 650C. IN ADDITION TO THE  
AS-EXTRUDED CONDITION, TESTS WERE ALSO RUN ON  
MATERIAL ANNEALED 10 HOURS AT 650C. ON AVERAGE,  
ALL MATERIALS RESPONDED TO THE PARTICLE SIZE AND  
VOLUME FRACTION OF THE DISPERSOID IN THE SAME  
DIRECTION, HOWEVER, IMPORTANT DIFFERENCES IN THE  
EXTENT AND RATE OF THE RESPONSE WERE OBSERVED FOR  
BOTH AS-EXTRUDED AND ANNEALED MATERIALS, AND IN TERMS  
OF METALLIC, INTERMETALLIC, OR OXIDIC DISPERSIONS.  
THE OXIDE DISPERSED ALLOYS TEND TO BEHAVE AS A COLD  
WORKED COPPER MATRIX STABILIZED BY A FINELY DISPERSED  
STABLE PHASE WHICH DOES NOT INTERACT DIRECTLY WITH  
THE MATRIX. THE METALLIC DISPERSED ALLOYS TEND TO  
BEHAVE AS REAL ALLOYS RESPONDING BOTH TO COLD WORK  
AND THE EFFECTS OF INTERACTIONS BETWEEN MATRIX AND  
DISPERSOID. IN THIS RESPECT THE 'INSOLUBLE' MO  
DISPERSOID PRODUCES A STRONGER, MORE STABLE ALLOY  
THAN DOES THE 'SOLUBLE' FE DISPERSOID.

(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-765 108 11/6  
STATE UNIV OF NEW YORK STONY BROOK DEPT OF MATERIALS  
SCIENCE

PRECIPITATION IN LIQUID-QUENCHED AL-BASE  
SI,

(U)

FEB 73 IOP AGARWAL, S. C. IKOCZAK, M.  
J. IHERMAN, H. I  
CONTRACT: DA-ARO-D-31-124-72-G60  
PROJ: DA-2-0-061102-B-32-D  
MONITOR: AROD 8571:2-MC

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN SCRIPTA METALLURGICA, V7  
P365-370 1973.

DESCRIPTORS: (\*ALUMINUM ALLOYS, DISPERSION  
HARDENING), (\*QUENCHING(COOLING), ALUMINUM  
ALLOYS), SILICON ALLOYS  
IDENTIFIERS: LIQUID QUENCHING

(U)

(U)

LIQUID-QUENCHING PRESENTS THE POSSIBILITY OF  
OBTAINING ALLOYS HAVING UNIQUE PROPERTIES.  
EXAMINATIONS WERE MADE ON HOW LIQUID QUENCHING CAN  
MODIFY THE RESPONSE TO AGE-HARDENING. THE REPORT  
IS ON LIQUID QUENCHING OF AL-BASE SI ALLOYS.  
SOME INTERESTING DIFFERENCES ARE NOTED BETWEEN  
LIQUID QUENCH AND SOLID QUENCH FOR THIS SYSTEM.  
(MODIFIED AUTHOR ABSTRACT)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-745 130 11/6  
STATE UNIV OF NEW YORK STONY BROOK DEPT OF MATERIALS  
SCIENCE

PHASE DECOMPOSITION OF LIQUID-QUENCHED AL-  
28 AT .% ZN,

(U)

FEB 73 11P AGARWAL, S. IKOCZAK, M. J. I  
HERMAN, H. I  
CONTRACT: DA-ARO-D-31-124-72-G60  
PROJ: DA-2-0-061102-B-32-D  
MONITOR: AROD 8571:3-MC

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN SCRIPTA METALLURGICA, V7  
N4 P401-408 1973.

DESCRIPTORS: (\*ALUMINUM ALLOYS, PHASE STUDIES),  
ZINC ALLOYS, CRYSTAL LATTICE DEFECTS,  
QUENCHING (COOLING), DECOMPOSITION, ELECTRON  
MICROSCOPY, X-RAY DIFFRACTION ANALYSIS  
IDENTIFIERS: ALUMINUM ALLOY 28ZN

(U)

(U)

AL-BASE ZN ALLOYS ARE KNOWN TO HAVE A STRONG  
TENDENCY TO DECOMPOSE DURING QUENCHING. IT IS ALSO  
KNOWN THAT QUENCHED-IN VACANCIES CAN PLAY AN  
IMPORTANT ROLE IN THE LOW TEMPERATURE DECOMPOSITION  
IN THIS SYSTEM. COOLING RATE THUS BECOMES AN  
IMPORTANT FACTOR IN PRECIPITATION BEHAVIOR. SINCE  
LIQUID-QUENCHING CAN ACHIEVE QUENCHING RATES OF THE  
ORDER OF 1,000,000C/SEC., IT WAS CONSIDERED  
FRUITFUL TO EXAMINE PHASE DECOMPOSITION BEHAVIOR IN  
LIQUID-QUENCHED (LQ) VS. SOLID-QUENCHED (SQ)  
SPECIMENS. LQ WILL OBTAIN A MORE RANDOM AS-  
QUENCHED STRUCTURE DUE TO EXTREMELY HIGH COOLING  
RATES. IN THE INVESTIGATION, LIQUID-QUENCHED  
SPECIMENS WERE STUDIED BY TRANSMISSION ELECTRON  
MICROSCOPY (TEM) AND SAXS TECHNIQUES. THE  
AGING TEMPERATURES WERE CHOSEN IN THE RANGE WHERE  
RESULTS ON BULK-QUENCHED MATERIAL ARE AVAILABLE.  
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-765 139 11/6  
STATE UNIV OF NEW YORK STONY BROOK DEPT OF MATERIALS  
SCIENCE

SPINODAL DECOMPOSITION IN LIQUID-QUENCHED  
AL-22 AT .% ZN,

(U)

MAR 73 10P AGARWAL, S. IHERMAN, H. I  
CONTRACT: DA-ARO-D-31-124-72-G60  
PROJ: DA-2-0-061102-B-32-D  
MONITOR: AROD 8751.4-MC

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN SCRIPTA METALLURGICA, V7  
NS P503-508 1973.

DESCRIPTORS: (\*ALUMINUM ALLOYS, DECOMPOSITION),  
ZINC ALLOYS, AGING(MATERIALS), X-RAY SPECTRUM,  
QUENCHING(COOLING), MICROSTRUCTURE, ELECTRON  
MICROSCOPY

(U)

IDENTIFIERS: ALUMINUM ALLOY 22ZN, TRANSMISSION  
ELECTRON MICROSCOPY

(U)

THE TEMPORAL EVOLUTION OF THE SMALL ANGLE X-RAY  
SCATTERING SPECTRA DURING AGING OF LIQUID-QUENCHED  
AL-22 AT.% ZN IS DISCUSSED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-765 141<sup>1</sup> 11/6  
UTAH UNIV SALT LAKE CITY DIV OF MATERIALS SCIENCE AND  
ENGINEERING

SUPERLATTICE FORMATION IN THE NI-CO SYSTEM,

(U)

SEP 72 7P WAN, C. M. IBYRNE, J. G. I  
CONTRACT: DA-ARO-D-31-124-70-657  
PROJ: DA-2-0-061102-B-32-D  
MONITOR: AROD 859113-MC

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN PHYSICA STATUS SOLIDI  
(A), V14 PK85-K87 1972.

DESCRIPTORS: (NICKEL ALLOYS, CRYSTAL LATTICES),  
COBALT ALLOYS, FATIGUE (MECHANICS), ANNEALING,  
COOLING

(U)

IDENTIFIERS: NICKEL ALLOY 20CO,  
SUPERLATTICES

(U)

THE PAPER DISCUSSES THE PRESENCE OF SUPERLATTICE  
STRUCTURE IN NI-20 CO FATIGUE SPECIMENS AFTER  
PRE-FATIGUE ANNEAL OF 600C FOR ONE HOUR.  
(AUTHOR)

(U)



UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-765 829 7/4  
STANFORD UNIV CALIF DEPT OF MECHANICAL ENGINEERING

INTERPRETATION OF SODIUM LINE-REVERSAL  
MEASUREMENTS IN RAPID EXPANSIONS OF NITROGEN,

(U)

OCT 71 5P MACDONALD, JOHN R. ;  
CONTRACT: F44620-68-C-0051  
PROJ: AF-9752  
TASK: 975202

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN JNL. OF CHEMICAL  
PHYSICS, V57 N2 P1016-1018, 15 JUL 72.  
SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH MAX-  
PLANCK-INSTITUT FUER PLASMAPHYSIK, MUENCHEN,  
GERMANY.

DESCRIPTORS: (•NITROGEN, •RELAXATION TIME),  
SHOCK WAVES, SODIUM, QUENCHING(INHIBITION),  
TEMPERATURE

(U)

IDENTIFIERS: MOLECULAR RELAXATION, ATOM MOLECULE  
INTERACTIONS, EXPANSION, MOLECULAR VIBRATION

(U)

MANY INVESTIGATIONS HAVE INDICATED THAT THE  
RELAXATION TIME FOR THE VIBRATION ENERGY OF NITROGEN  
IN RAPID EXPANSIONS WAS CONSIDERABLE LESS THAN BEHIND  
SHOCK WAVES. FOR MEASUREMENTS IN RAPID EXPANSIONS  
BASED ON THE SODIUM LINE-REVERSAL METHOD, THIS WORK  
SHOWS THAT THE DISCREPANCY CAN BE RESOLVED BY  
REDUCING THE DATA IN TERMS OF A NON-RESONANT NA-  
N2 INTERACTION MODEL. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-766 214 11/6  
LOCKHEED MISSILES AND SPACE CO INC PALO ALTO CALIF PALO  
ALTO RESEARCH LAB

PHYSICAL METALLURGY BASIS FOR ACHIEVING 300-  
KSI STRENGTH IN TRANSAGE TITANIUM ALLOYS. (U)

DESCRIPTIVE NOTE: FINAL REPT. 14 OCT 71-14 AUG 73,  
AUG 73 77P CROSSLEY, FRANK A. I  
CONTRACT: DAAG46-72-C-0016  
PROJ: DA-1-T-061101-A-91-A  
MONITOR: AMHRC CTR-73-28

UNCLASSIFIED REPORT

DESCRIPTORS: (TITANIUM ALLOYS, MECHANICAL  
PROPERTIES), MICROSTRUCTURE, ALUMINUM ALLOYS,  
TIN ALLOYS, VANADIUM ALLOYS, ZIRCONIUM ALLOYS (U)  
IDENTIFIERS: TITANIUM ALLOY 2.5AL 5SN 14.5V  
7ZR, TITANIUM ALLOY 3AL 5SN 15.5V 10ZR,  
TITANIUM ALLOY 2AL 2SN 11.5V 11ZR,  
TITANIUM ALLOY 2.1AL 2SN 11.9V, 6ZR (U)

FOUR MARTENSITIC TITANIUM ALLOYS: TRANSAGE 117  
(TI-2.5AL-14.5V-5SN-7ZR), TRANSAGE 120  
(TI-3AL-15.5V-5SN-10ZR), TRANSAGE 129  
(TI-2AL-11.5V-2SN-11ZR) AND TRANSAGE  
134 (TI-2.1AL-11.9V-2SN-6ZR) WERE STUDIED  
METALLOGRAPHICALLY TO DETERMINE THEIR MICROSTRUCTURAL  
CHARACTERISTICS IN BETA-ANNEALED AND ALPHA-BETA-  
ANNEALED CONDITIONS. THIN-FOIL ELECTRON  
TRANSMISSION WAS THE PRINCIPAL METALLOGRAPHIC MEANS  
BECAUSE THE ATHERMAL MARTENSITE OF THESE ALLOYS IS OF  
THE ORDER OF 10 A IN THICKNESS. THE ALLOYS  
UNDERGO STRESS INDUCED TRANSFORMATION IN THE ANNEALED  
CONDITION AND POSSIBLY THEY EXPERIENCE THIS  
PHENOMENON IN SOME AGE HARDENED CONDITIONS. THE  
ANNEALED CONDITIONS WERE STARTING STATES FOR  
THERMOMECHANICAL TREATMENT (TMT) STUDIES FOR  
ACHIEVING 300-KSI STRENGTH. THE STRENGTH GOAL  
SEEMED INHERENT IN A NUMBER OF THE COMBINATIONS OF  
ALLOY AND TMT SCHEDULE. CONFIRMATION OF THE  
STRENGTH GOAL WAS NOT REALIZED DUE TO DEFICIENCIES IN  
TEST SPECIMENS DESIGN AND CONDITION, AND IN THE  
QUALITY OF MACHINING. THE FRACTURE SURFACES SUGGEST  
THAT THE MATERIALS HAVE SUFFICIENT DUCTILITY TO  
DEMONSTRATE THE YIELD STRENGTH GOAL OF 300-KSI.  
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-766 328 11/6  
ALUMINUM CO OF AMERICA NEW KENSINGTON PA ALCOA RESEARCH  
LABS

COMPARISON OF ALUMINUM ALLOY 7050, 7049,  
MA52, AND 7175-T736 DIE FORGINGS. (U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT. 1 JUN 71-31  
DEC 72,

MAY 73 129P STALEY, JAMES T. I  
CONTRACT: F33615-69-C-1644  
PROJ: AF-7351  
TASK: 735105  
MONITOR: AFML TR-73-34

UNCLASSIFIED REPORT

DESCRIPTORS: (\*ALUMINUM ALLOYS, FORGING),  
(\*STRESS CORROSION, ALUMINUM ALLOYS),  
MICROSTRUCTURE, TENSILE PROPERTIES, YIELD POINT,  
FRACTURE (MECHANICS) (U)  
IDENTIFIERS: ALUMINUM ALLOY 7050, ALUMINUM ALLOY  
7049, ALUMINUM ALLOY MA52, ALUMINUM ALLOY 7175,  
DIE FORGINGS, FRACTURE STRENGTH (U)

DIE FORGINGS IN ALUMINUM ALLOYS 7050, 7049, AND  
MA52 WERE FABRICATED AND EVALUATED FOR RESISTANCE  
TO STRESS-CORROSION CRACKING, QUENCH SENSITIVITY, AND  
FRACTURE TOUGHNESS. IN ADDITION, ALL ALCOA DATA  
ON 7050, 7049, AND SPECIAL PROCESS 7175-T7X DIE  
FORGINGS WERE EXAMINED AND THE PROPERTIES WERE  
COLLATED. STRESS-CORROSION RESISTANCES WERE  
EVALUATED USING THE SEVEREST COMBINATIONS OF FORGING  
TYPE AND TEST CONDITIONS. ALL OF THESE NEWER  
ALLOYS WERE LESS QUENCH SENSITIVE THAN ALLOY 7075,  
AND ALL DEVELOPED BETTER COMBINATIONS OF RESISTANCE  
TO STRESS-CORROSION CRACKING AND FRACTURE TOUGHNESS  
THAN 7075-T6 AND 7079-T6 AT EQUAL STRENGTHS.  
BECAUSE IT DEVELOPED THE BEST COMBINATION OF  
PROPERTIES, ALLOY 7050 IS A PREFERRED SELECTION FOR  
USE AS DIE FORGINGS OF RELATIVELY HEAVY SECTION  
THICKNESS FOR THE AEROSPACE INDUSTRY. THIS ALLOY  
ALSO CAN BE SUPPLIED AS HAND FORGINGS, PLATE,  
EXTRUSIONS, AND SHEET. SPECIAL PROCESS 7175 IS AN  
EQUALLY GOOD SELECTION FOR DIE FORGINGS OF THIN TO  
MODERATE SECTION THICKNESS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-767 270 11/6  
CALIFORNIA UNIV BERKELEY LAWRENCE BERKELEY LAB

AN INVESTIGATION OF METALLURGICAL FACTORS  
WHICH AFFECT FRACTURE TOUGHNESS OF ULTRA-  
HIGH STRENGTH STEELS.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 26 JUN-26 DEC 72,  
MAY 73 213P WOOD, WILLIAM E. PARKER,  
EARL R. ZACKAY, VICTOR F. I  
REPT. NO. LBL-1474  
CONTRACT: DAAG46-72-C-0220, W-7405-ENG-48  
PROJ: DA-1-T-061101-A-91-A  
MONITOR: AMMRC CTR-73-24

UNCLASSIFIED REPORT

DESCRIPTORS: (\*STEEL, \*FRACTURE(MECHANICS)),  
TOUGHNESS, HEAT TREATMENT, MICROSTRUCTURE,  
MARTENSITE, EMBRITTLEMENT

(U)

IDENTIFIERS: HIGH STRENGTH STEELS, FRACTURE  
PROPERTIES, STEEL 4130, STEEL 4140, STEEL 4330,  
STEEL 4340, STEEL 300-M

(U)

THE RELATIONSHIP BETWEEN MICROSTRUCTURE, HEAT  
TREATMENT AND ROOM TEMPERATURE FRACTURE TOUGHNESS HAS  
BEEN DETERMINED FOR THE LOW ALLOY ULTRA-HIGH STRENGTH  
STEELS 4130, 4330, 4340, 4140 AND 300-M. OPTICAL  
METALLOGRAPHY, MICROPROBE ANALYSIS, AND SCANNING  
ELECTRON MICROSCOPY WERE USED TO CHARACTERIZE THE  
STRUCTURE AND MORPHOLOGY, WHILE BOTH CHARPY V-  
NOTCH IMPACT TESTS AND PLANE STRAIN FRACTURE  
TOUGHNESS TESTS WERE USED TO DETERMINE THE FRACTURE  
PROPERTIES. THE NORMAL COMMERCIAL HEAT TREATMENT  
RESULTED IN THE FORMATION OF SOME BAINITE IN ALL THE  
ALLOYS. MNS INCLUSIONS ON PRIOR AUSTENITE GRAIN  
BOUNDARIES WERE FOUND TO INITIATE CRACKS DURING  
LOADING. BY INCREASING THE AUSTENITIZING  
TEMPERATURE TO 1200C, THE FRACTURE TOUGHNESS COULD  
BE INCREASED BY AT LEAST 60%. FOR SOME ALLOYS  
INCREASING THE SEVERITY OF THE QUENCH IN CONJUNCTION  
WITH THE HIGHER AUSTENITIZING TEMPERATURES RESULTED  
IN FURTHER INCREASES IN THE FRACTURE TOUGHNESS, AND  
THE ELIMINATION OF ANY OBSERVABLE UPPER BAINITE.  
THERE WAS NO CORRELATION BETWEEN THE CHARPY  
IMPACT TEST RESULTS AND THE FRACTURE TOUGHNESS  
RESULTS. (MODIFIED AUTHOR ABSTRACT)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZONCI

AD-803 270 11/6  
AEROJET-GENERAL CORP SACRAMENTO CALIF MATERIALS RESEARCH  
LAB

TERNARY PHASE EQUILIBRIA IN TRANSITION METAL-BORON-  
CARBON-SILICON SYSTEMS. PART II. TERNARY SYSTEMS.  
VOLUME XIII. PHASE DIAGRAMS OF THE SYSTEMS TI-B-C,  
ZR-B-C, AND HF-B-C. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
APR 66 212P RUDY, E. WINDISCH, ST. I  
CONTRACT: AF 33(615)-1249  
PROJ: AF-7350  
TASK: 735001  
MONITOR: AFML TR-65-2-PT-2-VOL-13

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*TITANIUM ALLOYS, PHASE STUDIES),  
(\*ZIRCONIUM ALLOYS, PHASE STUDIES), (\*HAFNIUM  
ALLOYS, PHASE STUDIES), BORON, CARBON, SILICON,  
MELTING POINT, DIFFERENTIAL THERMAL ANALYSIS,  
SINTERING, PRESSES(MACHINERY), X RAYS,  
QUENCHING(COOLING), HYDRIDES, TEMPERATURE,  
ETCHING, MICROSTRUCTURE (U)

THE TERNARY ALLOY SYSTEMS TI-B-C, ZR-B-  
C, AND HF-B-C HAVE BEEN INVESTIGATED BY MEANS  
OF X-RAY, METALLOGRAPHIC, MELTING POINT, AND  
DIFFERENTIAL-THERMOANALYTICAL TECHNIQUES. THE  
EXPERIMENTAL ALLOY MATERIAL COMPRISED OF HOT-PRESSED  
AND SINTERED, ARC- AND ELECTRON-BEAM MOLTEN, AS WELL  
AS HIGH TEMPERATURE EQUILIBRATED AND QUENCHED,  
SPECIMENS; EACH PHASE OF THE EXPERIMENTAL WORK WAS  
SUPPORTED BY CHEMICAL ANALYSIS. THE RESULTS OF  
THIS INVESTIGATION ARE DISCUSSED AND POSSIBLE FIELDS  
OF APPLICATION OUTLINED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-816 189 11/6  
AEROJET-GENERAL CORP SACRAMENTO CALIF MATERIALS RESEARCH  
LAB

TERNARY PHASE EQUILIBRIA IN TRANSITION METAL-BORON-  
CARBON-SILICON SYSTEMS. PART I. RELATED BINARY  
SYSTEMS. VOLUME XI. FINAL REPORT ON THE MO-C  
SYSTEM.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,  
APR 67 68P RUDY, E. IWINDISCH, ST. I  
STOSICK, A. J. IHOFFMAN, J. R. I  
CONTRACT: AF 33(615)-1249  
PROJ: AF-7350  
TASK: 735001  
MONITOR: AFML TR-65-2-PT-1-VOL-11

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•MOLYBDENUM ALLOYS, •CARBON ALLOYS),  
X-RAY DIFFRACTION ANALYSIS, METALLOGRAPHY, MELTING  
POINT, TRANSFORMATIONS, HIGH-TEMPERATURE RESEARCH,  
QUENCHING(COOLING), DECOMPOSITION, POWDER  
METALS, IMPURITIES, GRAPHITE, DIFFERENTIAL THERMAL  
ANALYSIS, SINTERING, THERMAL EXPANSION, PHASE  
STUDIES, HELIUM, DIFFUSION  
IDENTIFIERS: BINARY ALLOYS, MOLYBDENUM CARBON  
ALLOYS

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THE BINARY ALLOY SYSTEM MOLYBDENUM-CARBON WAS  
INVESTIGATED BY MEANS OF X-RAY, METALLOGRAPHIC,  
THERMOANALYTICAL, AND MELTING POINT TECHNIQUES ON  
CHEMICALLY ANALYZED SPECIMENS. THE SYSTEM IS  
CHARACTERIZED BY THREE CONGRUENTLY MELTING,  
INTERMEDIATE PHASES, MO<sub>2</sub>C, ETA-MOC(1-X),  
AND ALPHA-MOC(1-X), OF WHICH ONLY MO<sub>2</sub>C IS  
STABLE AT TEMPERATURES BELOW 1650 C.

SUBSTOICHIOMETRIC (IS GREATER THAN 32.5 AT%  
C) DIMOLYBDENUM CARBIDE UNDERGOES A HOMOGENEOUS  
SUBLATTICE ORDER-DISORDER TRANSFORMATION AT  
TEMPERATURES OF APPROXIMATELY 1400 C, WHEREAS  
HYPERSTOICHIOMETRIC COMPOSITIONS UNDERGO A  
DISCONTINUOUS PHASE-CHANGE. THE ORDER-DISORDER  
TRANSITIONS IN THE ME<sub>2</sub>C PHASES ARE DISCUSSED IN  
TERMS OF THE STRUCTURAL CHANGES INVOLVED IN THE  
TRANSFORMATION PROCESSES AND THE ABSENCE OF LONG  
RANGE SUBLATTICE COHERENCY IN STOICHIOMETRIC OR  
HYPERSTOICHIOMETRIC COMPOSITIONS ATTRIBUTED TO THE  
IMPOSSIBILITY OF OBTAINING LONG RANGE.

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UNCLASSIFIED

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UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-851 293 11/6  
OFFICE OF NAVAL RESEARCH LONDON (ENGLAND)

METALLURGY AT LIVERPOOL,

(U)

APR 69 10P LIPSITT, HARRY A. :  
REPT. NO. ONRL-R-18-69

UNCLASSIFIED REPORT

DESCRIPTORS: (METALLURGY, GREAT BRITAIN),  
RESEARCH PROGRAM ADMINISTRATION, PHASE STUDIES,  
SOLID SOLUTIONS, MARTENSITE, FERRITES,  
FRACTURE(MECHANICS), RECRYSTALLIZATION,  
TEMPERING, DISLOCATIONS, UNIVERSITIES,  
DEOXIDATION(METALLURGY), STEEL,  
METALLOGRAPHY

(U)

THE REPORT IS A REVIEW OF MATERIALS RESEARCH IN THE  
METALLURGY DEPARTMENT, UNIVERSITY OF  
LIVERPOOL. CURRENT RESEARCH IN OXIDATION,  
SULPHIDATION, FRACTURE, RECRYSTALLIZATION, SOLID  
SOLUTION EFFECTS, DISLOCATION INTERACTIONS,  
MARTENSITE TRANSFORMATIONS AND TEMPERING IS  
DISCUSSED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-857 807 11/6 20/11  
NORTH AMERICAN ROCKWELL CORP LOS ANGELES CALIF LOS ANGELES  
DIV

DESIGN ALLOWABLES FOR TITANIUM ALLOYS. (U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT. MAY 66-MAY 69,  
JUN 69 380P SOMMER, ALFRED W. IMARTIN,  
GARDNER R. I  
REPT. NO. NA-69-350  
CONTRACT: AF 33(615)-3979  
PROJ: AF-7381  
TASK: 738106  
MONITOR: AFML TR-69-161

UNCLASSIFIED REPORT

DESCRIPTORS: (\*TITANIUM ALLOYS, MECHANICAL  
PROPERTIES), (\*MECHANICAL PROPERTIES, STATISTICAL  
DATA), HANDBOOKS, ALUMINUM ALLOYS, CHROMIUM  
ALLOYS, MOLYBDENUM ALLOYS, TIN ALLOYS, VANADIUM  
ALLOYS, THERMAL STABILITY (U)

IDENTIFIERS: TITANIUM ALLOY 4AL3MO1V,  
TITANIUM ALLOY 3AL11CR132, TITANIUM ALLOY  
6AL4V, TITANIUM ALLOY 6AL2SN6V (U)

THE PURPOSE OF THIS PROGRAM WAS TO DEVELOP DESIGN  
INFORMATION ON FOUR TITANIUM ALLOYS FOR INCLUSION  
INTO MILITARY HANDBOOK-5. THE ALLOYS  
INVESTIGATED WERE TI-6AL-4V CONDITION STA,  
TI-4AL-3MO-1V ANNEALED CONDITIONI TI-13V-  
11CR-3AL ANNEALED CONDITIONI AND TI-6AL-  
6V-25N ANNEALED CONDITION AND CONDITION  
STA. THE MECHANICAL PROPERTIES INVESTIGATED WERE  
TENSILE, COMPRESSION, SHEAR, BEARING, FRACTURE  
TOUGHNESS AND FATIGUE. (AUTHOR) (U)



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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-857 984 11/6 20/11  
ILLINOIS UNIV CHICAGO DEPT OF MATERIALS ENGINEERING

DYNAMIC BEHAVIOR OF METALS UNDER TENSILE  
IMPACT. PART II: ANNEALED AND COLD WORKED  
MATERIALS.

(U)

DESCRIPTIVE NOTE: INTERIM REPT. 1 MAR 67-15 MAR 69,  
JUN 69 49P SCHULTZ, ALBERT B. I  
CONTRACT: F33615-67-C-1283  
PROJ: AF-7351  
TASK: 735106  
MONITOR: AFML TR-69-76-PT-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•METALS, IMPACT SHOCK), ALUMINUM  
ALLOYS, STEEL, COPPER, BRASS, SHOCK WAVES,  
DYNAMICS, ANNEALING, LOADING(MECHANICS),  
TENSILE PROPERTIES

(U)

IDENTIFIERS: ALUMINUM ALLOY 1100, ALUMINUM  
2024

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-858 353 11/6  
BATTELLE MEMORIAL INST COLUMBUS OHIO DEFENSE METALS  
INFORMATION CENTER

REVIEW OF RECENT DEVELOPMENTS. HIGH-  
STRENGTH STEELS,

(U)

AUG 69 2P GROENEVELD, T. P. I

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*METALS, \*REVIEWS), STEEL,  
ARMOR, EMBRITTLEMENT, NICKEL ALLOYS, GRAIN SIZE,  
MARAGING STEELS, DEFECTS(MATERIALS), GRAIN  
BOUNDARIES, STRESS CORROSION

(U)

IDENTIFIERS: \*ANNOUNCEMENT BULLETINS

(U)

CONTENTS: UNIDIRECTIONALLY SOLIDIFIED WROUGHT  
STEEL ARMOR; TEMPER EMBRITTLEMENT OF ALLOY STEELS;  
THERMAL GRAIN REFINEMENT OF 18NI (300)  
MARAGING STEEL; INCLUSIONS IN HIGH-STRENGTH STEEL;  
EUROPEAN LITERATURE SURVEY. TEMPER EMBRITTLEMENT  
OF ALLOY STEELS; T

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-859 713 11/6 20/12 13/8  
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF  
ENGINEERING

THE INFLUENCE OF BETA PROCESSING VARIABLES  
ON THE MICROSTRUCTURE OF THE TITANIUM 6AL-4V  
ALLOY.

(U)

DESCRIPTIVE NOTE: MASTER'S THESIS,  
JUN 69 108P ADINOLFI, JERRY D. , JR.  
REPT. NO. GAW/MC/69-1

UNCLASSIFIED REPORT

DESCRIPTORS: (\*TITANIUM ALLOYS, MICROSTRUCTURE),  
FORGING, GRAIN STRUCTURES(METALLURGY),  
ALUMINUM ALLOYS, VANADIUM ALLOYS, GRAIN SIZE,  
DEFORMATION, TEMPERATURE, COOLING,  
QUENCHING(COOLING)  
IDENTIFIERS: TITANIUM ALLOY 6AL 4V, BETA  
FORGING

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AN OPEN DIE, PANCAKE FORGING STUDY WAS CONDUCTED TO  
DETERMINE THE INTERPLAY OF BETA PROCESSING VARIABLES  
(TEMPERATURE, DEFORMATION, AND COOLING RATE) IN  
CONTROLLING THE AS-WORKED (WROUGHT)  
MICROSTRUCTURE OF TI 6AL-4V. EMPHASIS WAS  
PLACED ON OBTAINING THE FINEST WROUGHT BETA STRUCTURE  
AND/OR FINEST RECRYSTALLIZED BETA GRAIN SIZE. BOTH  
MACROSTRUCTURES AND MICROSTRUCTURES WERE PREPARED AND  
OBSERVED OPTICALLY. IT WAS FOUND THAT THE FINEST  
WROUGHT STRUCTURE WAS OBTAINED BY INCREASING THE  
AMOUNT OF DEFORMATION AT THE HIGHER TEMPERATURE FOR  
EITHER AIR COOLING OR WATER QUENCHING.  
RECRYSTALLIZATION ENSUES IF THE MATERIAL IS HELD IN  
THE BETA FIELD IMMEDIATELY AFTER FORGING.  
(AUTHOR)

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UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-864 122 11/6 20/2  
MARTIN MARIETTA CORP ORLANDO FLA ORLANDO DIV

RESEARCH ON DEFORMATION AND POSSIBLE  
STRENGTHENING MECHANISMS FOR SOLID SOLUTION  
PHASES OF TITANIUM.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 1 JUN 66-31 JUL 69,  
DEC 69 76P CASS, THOMAS R. ISPENCER,  
WILLIAM R. ;  
REPT. NO. OR-10257  
CONTRACT: AF 33(615)-3863  
PROJ: AF-7351  
TASK: 735103  
MONITOR: AFML TR-69-293

UNCLASSIFIED REPORT

DESCRIPTORS: (\*TITANIUM ALLOYS, \*GRAIN  
STRUCTURES(METALLURGY)), TITANIUM, ALUMINUM  
ALLOYS, SINGLE CRYSTALS, SOLID SOLUTIONS, CRYSTAL  
GROWTH, DISLOCATIONS, CRYSTAL SUBSTRUCTURE,  
DEFORMATION, TWINNING(CRYSTALLOGRAPHY)  
IDENTIFIERS: SOLID SOLUTION ALLOYS

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THE REPORT IS A SUMMARY OF RESEARCH ON THE GROWTH,  
PERFECTION AND SLIP PROCESSES IN PURE TITANIUM AND  
TITANIUM-ALUMINUM SINGLE PHASE ALLOYS. A TECHNIQUE  
WAS DEVELOPED FOR THE GROWTH OF TITANIUM AND DILUTE  
TITANIUM ALLOY SINGLE CRYSTALS USING AN ELECTRON-BEAM  
ZONE REFINER. A DISLOCATION ETCHANT WAS  
DISCOVERED, ALLOWING THE PERFECTION OF THESE CRYSTALS  
OF 10 TO THE MINUS 9TH POWER/SQ CM. HOWEVER,  
ANNEALING THE CRYSTALS JUST BELOW THE TRANSFORMATION  
TEMPERATURE FOR LONG TIMES LOWERS THE DISLOCATION  
DENSITY BY TWO TO THREE ORDERS OF MAGNITUDE.  
COMPRESSION SPECIMENS WERE SPARK-EROSION MACHINED  
FROM SINGLE CRYSTALS, ANNEALED AND MECHANICALLY  
TESTED. A C-AXIS COMPRESSION SPECIMEN OF HIGH  
PURITY TITANIUM DEFORMED BY TWINNING. HOWEVER,  
HIGH INTERSTITIAL CONTENT AND DILUTE ALUMINUM ALLOYS  
BOTH DEFORMED BY C+A GLIDE WHEN THE LOAD AXIS WAS  
NEAR (0001). THIS ADDITIONAL DEFORMED SYSTEM  
ACCOUNTS FOR THE POLYCRYSTALLINE DUCTILITY OF ALPHA-  
TITANIUM ALLOYS. AN ANALYSIS OF PLASTIC  
DEFORMATION MODES IN TIAL WAS ALSO MADE.  
RESULTS ON POLYCRYSTALLINE TIAL WERE IN  
AGREEMENT WITH THESE PREDICTIONS. HOWEVER, SINGLE  
CRYSTALS COULD NOT BE GROWN FOR DEFINITIVE  
VERIFICATION OF THE HYPOTHESIZED MODES.  
(AUTHOR)

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/ZOHCI

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-867 106 11/6 19/1 13/8  
ALUMINUM CO OF AMERICA NEW KENSINGTON PA ALCOA RESEARCH  
LABS

FEASIBILITY STUDY FOR DEVELOPMENT OF AN  
ALUMINUM ALLOY FOR FABRICATION OF SMALL  
ARMS CARTRIDGE CASES.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 28 JUN 68-28 OCT 69,  
NOV 69 70P ROGERS, RALPH W. , JR  
CONTRACT: DAAA25-68-C-0771

UNCLASSIFIED REPORT

DESCRIPTORS: (\*CARTRIDGE CASES, SMALL ARMS  
AMMUNITION), (\*ALUMINUM ALLOYS, METALLOGRAPHY),  
HEAT TREATMENT, AGING(MATERIALS), DISPERSION  
HARDENING, GRAIN STRUCTURES(METALLURGY), STRESS  
RELIEVING, CORROSION RESISTANCE, STRESS CORROSION,  
CRACKS, HARDNESS, THERMAL STABILITY,  
QUENCHING(COOLING), MAGNESIUM ALLOYS, MATERIAL  
FORMING, FRACTOGRAPHY, ZINC ALLOYS, AGE HARDENING,  
COPPER ALLOYS, STRAIN HARDENING, TENSILE  
PROPERTIES, TEMPERATURE, ROLLING(METALLURGY),  
FRACTURE(MECHANICS), YIELD POINT, TOUGHNESS,  
NOTCH TOUGHNESS

(U)

IDENTIFIERS: STRESS CORROSION CRACKING, ALUMINUM  
ALLOY MA07, ALUMINUM ALLOY MA08, ALUMINUM  
ALLOY MA09, ALUMINUM ALLOY MA05, ALUMINUM  
ALLOY MA06

(U)

FIVE EXPERIMENTAL, LOW IMPURITY CONTENT ALUMINUM  
ALLOYS WERE EVALUATED FOR CHARACTERISTICS SUCH AS  
TENSILE PROPERTIES, FRACTURE TOUGHNESS, RESISTANCE TO  
CORROSION AND STRESS CORROSION, TEMPERATURE STABILITY  
AND QUENCH SENSITIVITY. ALTHOUGH NONE OF THE ALLOYS  
ACHIEVED THE TARGET STRENGTH-TOUGHNESS CRITERIA, TWO  
COMPOSITIONS WERE SUPERIOR TO CONVENTIONAL ALLOYS IN  
THIS RESPECT. THESE WERE NOMINALLY AL-5 ZN-2.4  
MG-1.2 CU-.15 CR (MA07) AND AL-5.9 ZN-  
2.4 CU-2.2 MG-.3 MN (MA08). ONE STRAIN-  
HARDENABLE ALLOY, AL-7.5 MG-.1 MN-.1 CR  
(MA09) WAS INCLUDED IN THE EVALUATION AND  
DISPLAYED GOOD NOTCH TOUGHNESS AND MODERATE  
RESISTANCE TO CRACK GROWTH BUT AT A RELATIVELY LOW  
STRENGTH LEVEL COMPARED TO THE HEAT-TREATABLE ALLOYS.  
ELECTRON METALLOGRAPHY AND FRACTOGRAPHY SHOWED  
FRACTURE TOUGHNESS TO DEPEND UPON THE RELATIVE  
PROPORTIONS OF FRACTURE PATH THAT WERE INTERGRANULAR  
OR TRANSGRANULAR AND, HENCE, UPON RELATIVE STRENGTHS  
OF GRAIN INTERIORS AND BOUNDARIES.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-873 261 11/6  
REYNOLDS METALS CO RICHMOND VA METALLURGICAL RESEARCH  
DIV

HIGH STRENGTH ALUMINUM ALLOY  
DEVELOPMENT.

(U)

DESCRIPTIVE NOTE: ANNUAL SUMMARY TECHNICAL REPT. 1 JUN  
69-31 MAY 70,

AUG 70 77P THOMPSON, DAVID S. LEVY,

SANDER A. I

CONTRACT: F33615-69-C-1643

PROJ: AF-7351

TASK: 735105

MONITOR: AFML TR-70-171

UNCLASSIFIED REPORT

DESCRIPTORS: (ALUMINUM ALLOYS, MECHANICAL  
PROPERTIES), QUENCHING(COOLING),  
FRACTURE(MECHANICS), STRESS CORROSION, TENSILE  
PROPERTIES, FORGING, METAL PLATES,  
MICROSTRUCTURE

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THE STUDY ATTEMPTS TO PRODUCE AN ALLOY SUITABLE FOR  
3 IN. PLATE OR AN 8 IN THICK FORGING POSSESSING  
DEFINITE STRENGTH, STRESS CORROSION, FRACTURE  
TOUGHNESS, AND FATIGUE PROPERTIES. VARIOUS QUENCHES  
WERE USED ON 1 IN PLATE TO SIMULATE QUENCHING THESE  
PRODUCTS. A SINGLE COMPOSITION OF 6.75% ZN,  
2.5% MG, 1.2% CU WAS CHOSEN AND BOTH THE MINOR  
ADDITION ELEMENTS (ZR, CR, AND MN) AND THE  
AGING PRACTICES WERE VARIED. (AUTHOR)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-873 832 11/6 11/4  
UNITED AIRCRAFT CORP EAST HARTFORD CONN RESEARCH LABS

INVESTIGATION TO DEVELOP A HIGH STRENGTH  
EUTECTIC ALLOY WITH CONTROLLED  
MICROSTRUCTURE.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 1 AUG 69-31 JUL 70,  
JUL 70 89P THOMPSON, EARL R. 1GEORGE,  
FREDERICK D. 1KRAFT, EDWIN H. 1  
REPT. NO. UACRL-J910868-4  
CONTRACT: N00019-70-C-0052

UNCLASSIFIED REPORT

DESCRIPTORS: (NICKEL ALLOYS, EUTECTICS),  
(EUTECTICS, COMPOSITE MATERIALS), ALUMINUM  
ALLOYS, NIOBIUM ALLOYS, INTERMETALLIC COMPOUNDS,  
MICROSTRUCTURE, FREEZING, FATIGUE (MECHANICS),  
PHASE STUDIES, HEAT-RESISTANT METALS + ALLOYS  
IDENTIFIERS: SUPERALLOYS, EUTECTIC COMPOSITES,  
DIRECTIONALLY SOLIDIFIED EUTECTICS

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THE N13AL (GAMMA') - N13CB (DELTA)  
EUTECTIC ALLOY WAS DIRECTIONALLY SOLIDIFIED IN A  
PLANE FRONT MANNER AT RATES VARYING FROM 0.3 TO 10.6  
CPH. THE LAMELLAR SPACING WHICH DECREASED WITH  
INCREASING RATE AFFECTED THE STRENGTH OF THE EUTECTIC  
ACCORDING TO A HALL-PETCH CORRELATION. BY  
DECREASING THE SPACING BY A FACTOR OF 4.7, THE  
TENSILE STRENGTH WAS INCREASED BY 35 PERCENT AT ROOM  
TEMPERATURE AND BY 100 PERCENT AT 2000F. THE  
EUTECTIC GROWN AT 10.6 CPH POSSESSED THE PHENOMENAL  
STRENGTH OF 140,000 PSI AT 2000F. THE RESISTANCE  
OF THE EUTECTIC TO A TENSION-TENSION FATIGUE CYCLE  
PROVED EXCELLENT. THIS RESISTANCE WAS PROVIDED BY  
THE STRENGTH OF THE PHASES, AS WELL AS THE PRESENCE  
OF DEBONDABLE INTERFACES WHICH AFFECT CRACK  
PROPAGATION. THERMAL FATIGUE TESTS CONDUCTED ON THE  
DIRECTIONALLY SOLIDIFIED EUTECTIC SHOWED NO ADVERSE  
EFFECT DUE TO THE DIFFERENCES IN THERMAL EXPANSION OF  
THE PHASES. QUENCHING THE EUTECTIC PRODUCED A RES  
DUAL TENSILE STRESS IN THE GAMMA' WHICH LOWERED THE  
PROPORTIONAL LIMIT OF THE COMPOSITE. STUDIES OF THE  
STRENGTH ANISOTROPY SHOWED THAT THE STRENGTH IS  
DECREASED IN DIRECTIONS NONPARALLEL TO THE GROWTH  
AXIS WITH BRITTLE BEHAVIOR AT ROOM TEMPERATURE AND  
DUCTILE BEHAVIOR AT 2000F. (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHCI

AD-875 540 11/6 13/8  
BATTELLE MEMORIAL INST COLUMBUS OHIO DEFENSE METALS  
INFORMATION CENTER

REVIEW OF RECENT DEVELOPMENTS. ALUMINUM AND  
MAGNESIUM,

(U)

OCT 70 6P WILLIAMS, D. N. I

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (\*ALUMINUM ALLOYS, REVIEWS),  
(\*MAGNESIUM ALLOYS, REVIEWS), PROPELLANT TANKS,  
CASTING, ZINC ALLOYS, CORROSION RESISTANCE, HEAT  
TREATMENT, STRAIN(MECHANICS), POWDER METALLURGY,  
CASTING ALLOYS, COPPER ALLOYS

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IDENTIFIERS: ANNOUNCEMENT BULLETINS

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CONTENTS: PROPELLANT TANK FABRICATED FROM 2021  
ALLOY; IMPROVED PROPERTIES BY CONTROLLED  
SOLIDIFICATION; FINISHING TECHNIQUES FOR MAGNESIUM;  
IMPROVING STRESS-CORROSION RESISTANCE OF HIGH-  
STRENGTH ALUMINUM-ZINC-MAGNESIUM ALLOYS; REDUCING  
QUENCH SENSITIVITY OF HIGH-STRENGTH ALUMINUM-ZINC-  
MAGNESIUM ALLOYS; EFFECTS OF SMALL AMOUNTS OF  
STRAIN ON THE PROPERTIES OF 2024 ALLOY; HIGH-  
STRENGTH ALUMINUM-ZINC-MAGNESIUM ALLOYS PREPARED BY  
POWDER METALLURGY PROCESSING; ADDITIONAL DATA ON  
KO-1 ALUMINUM-COPPER CASTING ALLOY; AND PROGRESS  
IN THE DEVELOPMENT OF WROUGHT ALUMINUM ALLOYS.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMCI

AD-885 271 11/6  
WESTINGHOUSE ELECTRIC CORP PITTSBURGH PA ASTRONUCLEAR  
LAB

THE RELATIONSHIP OF MICROSTRUCTURE AND  
MECHANICAL PROPERTIES OF EXTRUDED TITANIUM  
ALLOY BARS TO THE PRIOR DEFORMATION  
PROCESSING HISTORY.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT. 17 NOV 68-15 JUL 70,  
APR 71 92P GURNEY, FRED J. IMALE, ALAN

T. I

CONTRACT: F33615-69-C-1198  
PROJ: AF-7351  
TASK: 735108  
MONITOR: AFML TR-71-28

UNCLASSIFIED REPORT

DESCRIPTORS: (\*TITANIUM ALLOYS, \*MICROSTRUCTURE),  
(\*EXTRUSION, TITANIUM ALLOYS), MECHANICAL  
PROPERTIES, HEAT TREATMENT, SHEAR STRESSES,  
COOLING, ALUMINUM ALLOYS

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IDENTIFIERS: TITANIUM ALLOY 5AL 2.55N,  
TITANIUM ALLOY 6AL 4V, TITANIUM ALLOY 3AL  
11CR 13V

(U)

THE INTER-RELATION OF EXTRUSION PROCESS VARIABLES  
WITH MECHANICAL PROPERTIES AND MICROSTRUCTURE IS  
ANALYZED FOR THREE TITANIUM ALLOYS (TI-5AL-  
2.55N, TI-6AL-4V AND TI-13V-11CR-  
3AL). INFORMATION IS OBTAINED FROM DUPLICATE  
BILLETS WHICH WERE EXTRUDED AT SAME CONDITIONS WITH  
ONE EXTRUDED BAR ALLOWED TO AIR COOL AND THE OTHER  
BAR WATER QUENCHED IMMEDIATELY AFTER EXTRUSION.  
RESULTS INDICATE THAT SIGNIFICANT REDUCTION IN  
DEFORMATION LOADS CAN BE ACHIEVED IN ALPHA AND ALPHA-  
BETA TITANIUM ALLOYS BY PROCESSING THEM IN THE BETA  
TEMPERATURE RANGE. RESULTANT METALLURGICAL  
STRUCTURES AND MECHANICAL PROPERTIES (ROOM  
TEMPERATURE TENSILE AND CHARPY V NOTCH IMPACT)  
ARE FOUND TO NOT BE SIGNIFICANTLY AFFECTED BY PROCESS  
VARIABLES OTHER THAN PREHEAT TEMPERATURE AND PRODUCT  
COOLING RATE. IN ALPHA AND ALPHA-BETA ALLOYS, THE  
ROOM TEMPERATURE STRENGTH PROPERTIES OF BETA  
PROCESSED AND WATER QUENCHED PRODUCT IS SIGNIFICANTLY  
IMPROVED OVER THOSE OF BETA PROCESSED AND AIR COOLED  
PRODUCT AND SOMEWHAT IMPROVED OVER THOSE FOR ALPHA-  
BETA PROCESSED FOLLOWED BY EITHER AIR COOLING OR  
WATER QUENCHING.

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CORPORATE AUTHOR - MONITORING AGENCY

•AEROJET-GENERAL CORP AZUSA CALIF

0414 01 9  
STRESS-CORROSION CRACKING OF  
HIGH-STRENGTH ALLOYS.  
AD-405 898

•AEROJET-GENERAL CORP SACRAMENTO  
CALIF

TERNARY PHASE EQUILIBRIA IN  
TRANSITION METAL-BORON-CARBON-  
SILICON SYSTEMS. PART II. TERNARY  
SYSTEMS. VOL. 1. TA-HF-C SYSTEM.  
(AFML-TR-65-2-PT-2-VOL-1)  
AD-470 827

•AEROJET-GENERAL CORP SACRAMENTO  
CALIF MATERIALS RESEARCH LAB

TERNARY PHASE EQUILIBRIA IN  
TRANSITION METAL-BORON-CARBON-  
SILICON SYSTEMS. PART I. RELATED  
BINARY SYSTEMS. VOLUME VIII. ZR-B  
SYSTEM.  
(AFML-TR-65-2-PT-1-VOL-8)  
AD-480 949

TERNARY PHASE EQUILIBRIA IN  
TRANSITION METAL-BORON-CARBON-  
SILICON SYSTEMS. PART II. TERNARY  
SYSTEMS. VOLUME X. THE ZR-SI-C,  
HF-SI-C, ZR-SI-B, AND HF-SI-B  
SYSTEMS.  
(AFML-TR-65-2-PT-2-VOL-10)  
AD-489 752

TERNARY PHASE EQUILIBRIA IN  
TRANSITION METAL-BORON-CARBON-  
SILICON SYSTEMS. PART II. TERNARY  
SYSTEMS. VOLUME XIII. PHASE  
DIAGRAMS OF THE SYSTEMS TI-B-C, ZR-  
B-C, AND HF-B-C.  
(AFML-TR-65-2-PT-2-VOL-13)  
AD-803 270

TERNARY PHASE EQUILIBRIA IN  
TRANSITION METAL-BORON-CARBON-  
SILICON SYSTEMS. PART I. RELATED  
BINARY SYSTEMS. VOLUME XI. FINAL  
REPORT ON THE MO-C SYSTEM.

(AFML-TR-65-2-PT-1-VOL-11)  
AD-816 189

•AERONAUTICAL SYSTEMS DIV WRIGHT-  
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ASD-TDR62 181  
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ULTRA-RAPID QUENCHING ON METALLIC  
SYSTEMS, INCLUDING BERYLLIUM ALLOYS  
AD-284 409

ASD-TDR62 329  
A STUDY OF QUENCH HARDENING IN  
PLATINUM AND GOLD  
AD-282 836

ASD-TDR63 309 P1  
PEST REACTIONS IN INTERMETALLIC  
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HARDENING IN NiGa.  
AD-405 821

TDR62 329  
A STUDY OF QUENCH HARDENING IN  
PLATINUM AND GOLD  
(ASD-TDR62 329)  
AD-282 836

•AEROSPACE CORP EL SEGUNDO CALIF LAB  
OPERATIONS

TR-0172(2250-10)-3  
THE EFFECT OF MICROSTRUCTURE ON  
FATIGUE CRACK PROPAGATION IN Ti-6AL-  
4V-2Sn ALLOY.  
(SAMSO-TR-71-268)  
AD-733 335

•AEROSPACE RESEARCH LABS WRIGHT-  
PATTERSON AFB OHIO

ARL-63 104  
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AD-410 593

•AIR FORCE INST OF TECH WRIGHT-  
PATTERSON AFB OHIO SCHOOL OF  
ENGINEERING

GAW/MC/69-1

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AIR-AIR

THE INFLUENCE OF BETA  
PROCESSING VARIABLES ON THE  
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4V ALLOY.  
AD-859 713

AIR FORCE MATERIALS LAB WRIGHT-  
PATTERSON AFB OHIO

AFML-TDR64 134  
EQUILIBRIUM SOLUTIONS OF  
NITROGEN IN COLUMBIUM-BASE ALLOYS.  
AD-602 829

AFML-TR-65-2-PT-1-VOL-8  
TERNARY PHASE EQUILIBRIA IN  
TRANSITION METAL-BORON-CARBON-  
SILICON SYSTEMS. PART I. RELATED  
BINARY SYSTEMS. VOLUME VIII. ZR-B  
SYSTEM.  
AD-480 949

AFML-TR-65-2-PT-1-VOL-11  
TERNARY PHASE EQUILIBRIA IN  
TRANSITION METAL-BORON-CARBON-  
SILICON SYSTEMS. PART I. RELATED  
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REPORT ON THE MO-C SYSTEM.  
AD-816 189

AFML-TR-65-2-PT-2-VOL-1  
TERNARY PHASE EQUILIBRIA IN  
TRANSITION METAL-BORON-CARBON-  
SILICON SYSTEMS. PART II. TERNARY  
SYSTEMS. VOL. I. TA-HF-C SYSTEM.  
AD-470 827

AFML-TR-65-2-PT-2-VOL-10  
TERNARY PHASE EQUILIBRIA IN  
TRANSITION METAL-BORON-CARBON-  
SILICON SYSTEMS. PART II. TERNARY  
SYSTEMS. VOLUME X. THE ZR-SI-C,  
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AD-489 752

AFML-TR-65-2-PT-2-VOL-13  
TERNARY PHASE EQUILIBRIA IN  
TRANSITION METAL-BORON-CARBON-  
SILICON SYSTEMS. PART II. TERNARY  
SYSTEMS. VOLUME XIII. PHASE

DIAGRAMS OF THE SYSTEMS TI-B-C, ZR-  
B-C, AND HF-B-C.  
AD-803 270

AFML-TR-69-76-PT-2  
DYNAMIC BEHAVIOR OF METALS  
UNDER TENSILE IMPACT. PART II:  
ANNEALED AND COLD WORKED MATERIALS.  
AD-857 984

AFML-TR-69-161  
DESIGN ALLOWABLES FOR TITANIUM  
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AD-857 807

AFML-TR-69-293  
RESEARCH ON DEFORMATION AND  
POSSIBLE STRENGTHENING MECHANISMS  
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AFML-TR-70-171  
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AFML-TR-70-312  
IMPROVED PROPERTIES OF TI-6AL-  
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MODIFICATION.  
AD-723 636

AFML-TR-71-28  
THE RELATIONSHIP OF  
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AFML-TR-71-68  
FATIGUE STUDY OF QUENCHED AL-  
6.5 AT % ZN ALLOY.  
AD-726 582

AFML-TR-71-81  
MECHANISMS OF FATIGUE IN MILL-  
ANNEALED TI-6AL-4V AT ROOM  
TEMPERATURE AND 600F.  
AD-728 239

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AIR-ALU

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AFML-TR-71-104  
AN INVESTIGATION OF VERY-HIGH-  
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1100 ALUMINUM.  
AD-728 654

• • •  
AFML-TR-73-34  
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AD-766 328

• AIR FORCE OFFICE OF SCIENTIFIC  
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• • •  
AFOSR-65-0590  
DIFFUSION IN METALS AT ULTRA-  
HIGH PRESSURES.  
AD-614 839

• • •  
AFOSR-65-1802  
PLASMA JET CHEMISTRY.  
AD-625 591

• • •  
AFOSR-66-1601  
AN INTERNAL FRICTION STUDY OF  
VACANCIES IN A QUENCHED AU-NI SOLID  
SOLUTION.  
AD-641 786

• • •  
AFOSR-66-2150  
EXPERIMENTAL CONFIRMATION OF  
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TEMPERATURE AND COMPOSITION IN  
IONIC SOLIDS.  
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• • •  
AFOSR-67-1010  
MAGNETIC PROPERTIES OF  
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AD-652 132

• • •  
AFOSR-67-1091  
THE ROLE OF IMPERFECTION  
CHEMISTRY IN THE CHARACTERIZATION  
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• • •  
AFOSR-67-1224  
LATTICE PARAMETERS OF IRON-RICH

IRON-GALLIUM ALLOYS,  
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• • •  
AFOSR-67-1237  
SUPERCONDUCTING TRANSITIONS IN  
BODY-CENTERED CUBIC THALLIUM-INDIUM  
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AD-653 088

• • •  
AFOSR-68-0806  
EFFECT OF HEAT TREATMENT ON THE  
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AD-668 606

• • •  
AFOSR-68-1718  
HEAT TREATMENT EFFECTS ON SOME  
PHYSICAL PROPERTIES OF METALLIC  
SINGLE CRYSTALS.  
AD-678 931

• • •  
AFOSR-69-0820TR  
NUCLEAR MAGNETIC RESONANCE IN  
THALLIUM BORATE GLASSES. I. THE  
THALLIUM-205 CHEMICAL SHIFT,  
AD-683 905

• • •  
AFOSR-69-1887TR  
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AD-691 529

• • •  
AFOSR-7642  
IMPERFECTIONS IN METALS.  
AD-408 483

• ALBERTA UNIV EDMONTON

• • •  
TRANSFORMATIONS IN FE-CR  
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AD-634 220

• ALCOA RESEARCH LABS ALUMINUM CO OF  
AMERICA NEW KENSINGTON PA

• • •  
13-65-AP59-S-SECT-2  
DEVELOPMENT OF ALUMINUM-BASE  
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AD-479 783

• ALUMINUM CO OF AMERICA NEW  
KENSINGTON PA ALCOA RESEARCH LABS

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• • •  
INVESTIGATION TO DEVELOP A HIGH  
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FEASIBILITY STUDY FOR  
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AD-847 106

• • •  
13-AX202  
FEASIBILITY STUDY FOR  
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AD-749 508

•ALUMINUM CO OF AMERICA NEW  
KENSINGTON PA ALCOA RESEARCH LABS  
• • •  
COMPARISON OF ALUMINUM ALLOY  
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•ARCOS CORP PHILADELPHIA PA  
• • •  
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AD-726 758

•ARIZONA UNIV TUCSON  
• • •  
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•ARMY FOREIGN SCIENCE AND TECHNOLOGY  
CENTER CHARLOTTESVILLE VA  
• • •

FSTC-HT-23-492-70  
HEAT AND MECHANICAL TREATMENT  
OF TITANIUM AND ITS ALLOYS (CHAPTER  
5).  
AD-722 622

•ARMY FOREIGN SCIENCE AND TECHNOLOGY  
CENTER WASHINGTON D C

• • •  
FSTC-HT-23-236-70  
CHANGE IN PROPERTIES DURING  
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(ZAKONOMERNOSTI IZMENENIYA SVOISTV  
PRI STARENII ALYUMINIEVYKH  
SPRAYOV).  
AD-713 921

• • •  
FSTC-HT-23-237-70  
EFFECT OF COMBINED DEFORMATION  
AND HEAT TREATMENT ON PROPERTIES OF  
ALUMINUM ALLOYS (VLYNYANIE  
SOVMESHCHENNOI DEFORMATSIONNO-  
TERMICHESKOI OBRABOTKI NA SVOISTVA  
ALYUMINIEVYKH SPRAYOV).  
AD-713 979

• • •  
FSTC-HT-23-240-70  
STRENGTHENING OF MAGNESIUM  
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MAGNIEVYKH SPRAYOV, BOGATYKH  
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AD-714 120

•ARMY MATERIALS AND MECHANICS RESEARCH  
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• • •

AMMRC-CR-69-01(F)  
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AD-645 880

• • •  
AMMRC-CR-69-12(F)  
MICROSTRUCTURAL-MECHANICAL  
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AD-723 990

• • •  
AMMRC-CR-69-18/F  
EFFECT OF ALLOYING ELEMENTS ON  
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AD-718 091  
• • •

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ARM-ARM

AMHRC-CR-69-19  
IMPROVED PROCESSING PROCEDURES  
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AD-699 419

• • •  
AMHRC-CR-70-6  
MANUFACTURING METHODS, AND  
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DIRECTIONALLY SOLIDIFIED 48 IN. X  
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AD-716 368

• • •  
AMHRC-CTR-73-24  
AN INVESTIGATION OF  
METALLURGICAL FACTORS WHICH AFFECT  
FRACTURE TOUGHNESS OF ULTRA-HIGH  
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AD-767 270

• • •  
AMHRC-CTR-73-28  
PHYSICAL METALLURGY BASIS FOR  
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AD-766 214

• • •  
AMHRC-TR-69-03  
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• • •  
AMHRC-TR-71-48  
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AD-735 314

• • •  
AMHRC-TR-71-58  
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AD-739 906

• • •  
AMHRC-TR-72-39  
THERMAL EMBRITTLEMENT OF 4340  
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AD-763 900

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WATERTOWN MASS

• • •

AMRA-CR63 04 1  
INVESTIGATION OF SOLIDIFICATION  
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AD-432 999

• ARMY RESEARCH OFFICE DURHAM N C

• • •  
AROD-1540 6  
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AD-281 854

• • •  
AROD-3369:4  
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AD-666 872

• • •  
AROD-4975:3  
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AD-643 302

• • •  
AROD-5010:10  
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• • •  
AROD-5409:2-MC  
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•BATTELLE MEMORIAL INST COLUMBUS OHIO

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•BRIGHAM YOUNG UNIV PROVO UTAH DEPT  
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•CONNECTICUT UNIV STORRS

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•DAVID TAYLOR MODEL BASIN WASHINGTON  
D C STRUCTURAL MECHANICS LAB

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• ELECTRO-OPTICAL SYSTEMS INC PASADENA  
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 \*FRANKFORD ARSENAL PHILADELPHIA PA

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•FRANKLIN INST RESEARCH LABS  
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•GENERAL DYNAMICS/CONVAIR SAN DIEGO  
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•GENERAL ELECTRIC CO SCHENECTADY N Y

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•GENERAL ELECTRIC CO SCHENECTADY N Y  
 RESEARCH AND DEVELOPMENT CENTER

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•ILLINOIS INST OF TECH CHICAGO

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•ILLINOIS INST OF TECH CHICAGO DEPT  
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•ILLINOIS UNIV CHICAGO DEPT OF  
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•ILLINOIS UNIV URBANA

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•ILLINOIS UNIV URBANA MATERIALS  
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•LEHIGH UNIV BETHLEHEM PA DEPT OF  
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\*LINDEN LABS INC STATE COLLEGE PA

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\*LOCKHEED MISSILES AND SPACE CO INC  
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• • •  
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\*LOCKHEED MISSILES AND SPACE CO  
 SUNNYVALE CALIF

• • •  
 BERYLLIUM: AN ANNOTATED  
 BIBLIOGRAPHY, JULY - SEPTEMBER  
 1962, SUPPLEMENT II,  
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\*LOCKHEED-GEORGIA CO MARIETTA  
 MATERIALS RESEARCH AND DEVELOPMENT  
 LAB

• • •  
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\*MANLABS INC CAMBRIDGE MASS

• • •  
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\*MARTIN MARIETTA CORP BALTIMORE MD  
 RESEARCH INST FOR ADVANCED STUDIES

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\*MARTIN MARIETTA CORP ORLANDO FLA  
 ORLANDO DIV

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• • •  
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\*MASSACHUSETTS INST OF TECH CAMBRIDGE

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AD-718 902

\*MASSACHUSETTS INST OF TECH CAMBRIDGE

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\*MASSACHUSETTS INST OF TECH CAMBRIDGE  
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AD-749 679

• • •  
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BIBLIOGRAPHY, JULY SEPTEMBER 1962,  
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REPRINT: EXTENSION OF SOLID  
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REPRINT: TRANSFORMATIONS IN FE-  
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AD-634 220

\*COBALT  
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\*COBALT ALLOYS  
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REPRINT: COBALT IN THE TERNARY  
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REPRINT: SPINOAL DECOMPOSITION  
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REPRINT: FATIGUE HARDENING IN  
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AD-697 603
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- CERAMIC MATERIALS  
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- HALIDES  
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